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Postoperative psychological distress beyond pain: a narrative review of psychosocial determinants across global surgical settings

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ABSTRACT

INTRODUCTION: Postoperative recovery is traditionally managed via a biomedical framework prioritizing pain control. However, psychological distress, including anxiety and depression, is highly prevalent and often exists independently of physical symptoms. This narrative review synthesizes recent global evidence (2021–2026) to examine the psychosocial determinants of postoperative distress, specifically emotional regulation, coping mechanisms, and social support across diverse healthcare contexts.

MATERIALS AND METHODS: A systematic search was conducted across PubMed, Google Scholar and the Web of Science. Study selection followed PRISMA principles, focusing on peer-reviewed primary research and systematic reviews involving adult surgical populations. Data were extracted regarding psychological outcomes and psychosocial predictors, then synthesized using a narrative thematic approach.

RESULTS: Findings reveal a significant discordance between pain intensity and psychological morbidity; high distress levels persist even with well-controlled pain. Emotional dysregulation and maladaptive coping are core drivers of postoperative anxiety. While perceived social support is a consistent protective buffer, its efficacy is mediated by socioeconomic factors. In LMICs, distress is amplified by financial toxicity and systemic barriers, whereas HICs struggle to integrate psychological care into standardized biomedical pathways.

CONCLUSIONS: Postoperative psychological distress is a multifactorial phenomenon that pain scores alone cannot adequately predict. Optimizing global surgical outcomes requires a transition toward a biopsychosocial model that incorporates routine psychological screening, targeted emotional regulation interventions, and context-sensitive social support strategies.

KEY WORDS: Postoperative distress, psychosocial determinants, emotional regulation, social support, surgical recovery, global health.

INTRODUCTION

Postoperative recovery has traditionally been conceptualized within a predominantly biomedical framework, emphasizing physical outcomes such as pain control, wound healing, and the prevention of complications. Within this paradigm, pain has long been regarded as the primary determinant of postoperative recovery and overall patient well-being. Clinical protocols and perioperative guidelines continue to prioritize pain assessment as a central indicator of recovery quality [1,2]. However, this perspective is increasingly recognized as incomplete, as it overlooks the substantial contribution of psychological outcomes to recovery trajectories.

Emerging evidence indicates that psychological distress, including anxiety, depression, and stress, is highly prevalent among surgical patients across perioperative and postoperative phases. Global estimates suggest that 20–40% of patients experience clinically significant anxiety preoperatively, while postoperative depressive symptoms have been reported in approximately 10-30% of patients, depending on surgical type and population characteristics [3,4]. Importantly, these psychological outcomes are not merely transient reactions but may persist beyond the immediate recovery period, contributing to delayed functional recovery, reduced quality of life, and increased healthcare utilization [5,6]. Despite growing recognition of psychological morbidity in surgical populations, routine postoperative care remains largely focused on physical parameters, with limited integration of structured psychological assessment and intervention. This gap reflects a long-standing assumption within clinical practice, that effective pain control will inherently lead to improved psychological outcomes. While pain and psychological distress are interrelated, the relationship is complex and not consistently linear. Systematic reviews have demonstrated that preoperative psychological factors may independently predict postoperative pain, and conversely, patients may experience significant psychological distress even in the presence of well-controlled pain [6,7]. This bidirectional and sometimes discordant relationship challenges the adequacy of pain-centric recovery models.

In response, there has been increasing attention to psychosocial determinants of postoperative psychological outcomes. Among these, emotional regulation and coping strategies play a critical role in shaping patients' responses to surgical stress. Maladaptive coping mechanisms, such as catastrophizing, avoidance, and rumination, have been consistently associated with higher levels of anxiety and depression [8,9]. These processes influence not only emotional outcomes but also pain perception and recovery behaviors, highlighting their clinical relevance as modifiable targets within perioperative care. Perceived social support represents another key determinant of psychological well-being in surgical patients. Strong social networks, including family involvement and caregiver support, have been associated with reduced psychological distress and improved recovery outcomes. Conversely, social isolation and unmet support needs significantly increase vulnerability to anxiety and depressive symptoms [10,11]. The protective effects of social support extend beyond emotional reassurance, encompassing practical assistance, healthcare navigation, and buffering against stress-related physiological responses.

Importantly, the influence of these psychosocial factors is shaped by broader contextual and health system differences. In high-income countries (HICs), perioperative care pathways increasingly incorporate elements of psychological support, such as patient education and rehabilitation programs. In contrast, in low- and middle-income countries (LMICs), psychological distress is often compounded by structural challenges, including financial burden, limited access to healthcare services, and reliance on informal caregiving systems [12,13]. These disparities highlight the need for context-sensitive approaches to understanding postoperative psychological outcomes. Despite these advancements, several critical gaps remain in the literature. First, the relationship between pain and psychological distress is frequently oversimplified, with insufficient exploration of their potential discordance and bidirectional dynamics. Second, although individual psychosocial factors such as emotional regulation and social support have been widely studied, they are rarely integrated into a unified explanatory framework. Third, comparative analyses across HIC and LMIC settings remain limited, particularly regarding how structural and contextual factors shape psychological outcomes. Finally, there is a lack of synthesis linking these determinants to specific surgical contexts, despite evidence suggesting variability in psychological risk across procedures.

Therefore, this narrative review aims to synthesize recent evidence on postoperative psychological distress and its psychosocial determinants. Specifically, it seeks to examine: (1) the relationship between pain and psychological outcomes, (2) the role of emotional dysregulation and coping processes, (3) the influence of perceived social support, and (4) differences across high-income and low- and middle-income settings. Additionally, this review aims to explore how these factors interact with surgical context to influence psychological risk, thereby providing a more comprehensive understanding of postoperative recovery beyond a purely pain-centered model.

MATERIAL AND METHODS

This study was conducted as a narrative review, an approach chosen to facilitate an interpretive and thematic synthesis of heterogeneous evidence across various study designs, populations, and healthcare contexts. By integrating diverse data types, this methodology allowed for a nuanced exploration of postoperative psychological distress and its psychosocial determinants that a purely quantitative meta-analysis could not achieve. A comprehensive literature search was executed across major biomedical and interdisciplinary databases, including PubMed, Google Scholar and the Web of Science. The search focused on studies published between January 2021 and February 19, 2026, capturing contemporary evidence that reflects current perioperative practices. Search terms were iteratively refined across four primary domains: the population (postoperative or perioperative adult surgical patients), outcomes (psychological distress such as anxiety, depression, and stress), predictors (psychosocial factors like emotional regulation and social support), and the global setting. A representative search string utilized Boolean operators to link terms such as “postoperative” and “perioperative” with specific psychological outcomes and psychosocial determinants, with syntax adapted for each individual database.

Eligibility was determined through specific inclusion and exclusion criteria. Studies were included if they were peer-reviewed primary research or systematic reviews, involved adult surgical populations, and reported on postoperative psychological outcomes in relation to at least one psychosocial determinant, such as emotional regulation or perceived social support. Conversely, studies were excluded if they were non-peer-reviewed such as preprints or conference abstracts, focused exclusively on preoperative outcomes without postoperative linkage, or involved pediatric populations. The selection process involved two distinct stages: an initial title and abstract screening followed by a comprehensive full-text review, both guided by the predefined eligibility criteria.

Data extraction followed a structured approach to ensure consistent comparison and thematic grouping. Key information was captured regarding study characteristics, surgical contexts, validated measurement tools such as the HADS, PHQ-9, and DASS-21, and psychosocial predictors. While a formal risk-of-bias assessment was not conducted due to the narrative nature of the review, methodological rigor was maintained by prioritizing index-listed studies and those employing validated instruments. Furthermore, countries were classified using the World Bank Country and Lending Groups framework into high-income countries (HICs) and low- and middle-income countries (LMICs) to enable a comparative analysis of structural and contextual influences on patient outcomes [14].

Finally, the data were synthesized using a narrative thematic approach. Findings were analyzed iteratively to identify repeated patterns and conceptual similarities across studies, focusing specifically on the relationship between pain and distress, emotional regulation, social support, and system-level influences. Although the review is subject to limitations common to narrative designs, such as potential selection bias and the restriction to English-language publications, the structured search strategy and the use of high-quality, peer-reviewed sources enhance the overall credibility and depth of the synthesis.

RESULTS

Discordance Between Pain and Psychological Distress

Evidence across diverse surgical populations indicates that postoperative psychological distress does not consistently align with pain intensity. While pain has traditionally been considered a primary driver of postoperative well-being, emerging data demonstrate a clear discordance between nociceptive and psychological experiences. For instance, in a prospective study of patients undergoing cataract surgery, anxiety remained highly prevalent (38.4%) despite predominantly mild postoperative pain, with no statistically significant correlation between anxiety and pain scores [15]. This provides direct empirical support for the independence of psychological distress from pain intensity in low-risk surgical contexts. Similar patterns are observed in more complex clinical settings. In oncologic abdominal surgery, anxiety levels increased during hospitalization despite stable physical recovery and no parallel deterioration in other psychological domains [16].

Furthermore, large-scale multicentre data demonstrate temporal dissociation, with anxiety peaking in the preoperative phase (~38%) while pain becomes more prominent postoperatively (~70%), indicating distinct trajectories rather than a linear relationship [17]. This discordance appears consistent across high-income countries (HICs) and low- and middle-income countries (LMICs/UMICs). However, in resource-constrained settings, the disconnect may be amplified by contextual stressors such as inadequate preoperative information, financial burden, uncertainty regarding outcomes, and caregiving constraints [18,19]. Collectively, these findings suggest that postoperative distress is frequently driven by cognitive, emotional, and contextual factors, rather than nociceptive input alone.

Pain as a Limited Predictor of Psychological Outcomes

Although pain remains a critical component of postoperative recovery, its predictive value for psychological outcomes is limited when considered in isolation. Across studies, pain demonstrates poor discriminatory capacity in identifying patients at risk for anxiety or depression, particularly when psychosocial variables are not concurrently assessed. Importantly, the relationship between pain and psychological distress is increasingly recognized as bidirectional. Prospective evidence indicates that pre-existing anxiety and depressive symptoms significantly predict higher postoperative pain levels [20]. This suggests that psychological vulnerability may precede and amplify physical symptom perception, rather than simply resulting from it. At the same time, pain may contribute to distress in specific contexts, but this association is inconsistent and often mediated by psychosocial factors such as coping and perceived stress [19].

Notably, substantial levels of anxiety and depression persist even in HIC settings with advanced pain management protocols, reinforcing that biomedical optimization alone is insufficient to ensure psychological recovery [21]. In LMIC and UMIC settings, this limitation is further compounded by structural challenges, including financial strain and unmet care needs, which independently contribute to psychological distress [18]. These findings collectively challenge the use of pain as a proxy indicator for psychological well-being, supporting a more multidimensional model of postoperative recovery.

Emotional Dysregulation and Maladaptive Coping

Emotional dysregulation emerges as a central mechanism underpinning postoperative psychological distress. Patients who demonstrate difficulty regulating emotional responses, or who engage in maladaptive coping strategies such as catastrophizing and avoidance, consistently exhibit higher levels of anxiety and depressive symptoms. Empirical evidence supports this relationship across multiple contexts. Early postoperative studies have identified catastrophizing as a significant predictor of depressive symptoms, highlighting the role of cognitive–affective processes in shaping psychological outcomes [22]. Similarly, coping patterns characterized by escape-avoidance behaviors have been shown to independently predict distress over time [23].

Intervention-based evidence further reinforces the importance of emotional regulation as a modifiable determinant. Systematic review data indicate that interventions targeting emotional regulation, often grounded in cognitive-behavioral frameworks, can improve psychological outcomes in surgical populations [24]. However, high attrition rates observed across studies suggest challenges in implementation and sustained engagement. Although direct measurement of emotional regulation constructs is more prevalent in HIC research, studies from UMIC and LMIC contexts incorporating related constructs (e.g., coping styles and perceived stress) demonstrate comparable associations [19,25]. This supports the cross-context relevance of emotional regulation as a key determinant of postoperative psychological health.

Role of Perceived Social Support and Social Context

Perceived social support is one of the most consistent predictors of postoperative psychological outcomes. Across settings, patients with stronger social networks demonstrate lower levels of anxiety and depression, whereas social isolation is strongly associated with increased psychological morbidity. Quantitative evidence supports this relationship. Poor social support has been identified as an independent predictor of postoperative depression in LMIC settings [26], while social isolation has been strongly associated with depressive symptoms in surgical populations [27]. Longitudinal evidence further suggests that changes in perceived support needs are closely linked to trajectories of anxiety over time [28].

In HIC settings, social support is often embedded within structured perioperative care pathways, including rehabilitation services, patient education, and family-inclusive care planning [21]. These systems facilitate both emotional reassurance and practical support, contributing to improved recovery experiences. In contrast, in LMIC and UMIC contexts, social support is deeply intertwined with socioeconomic realities. Support frequently extends beyond emotional domains to include financial assistance, transportation, and caregiving labor. Deficits in support are therefore multidimensional and often act as amplifiers of distress, particularly in populations facing financial hardship or limited access to care [18]. These findings highlight the need to conceptualize social support within a broader socioeconomic and structural framework, particularly when comparing global surgical populations.

Surgery-Specific Risk and Contextual Amplifiers

Psychological distress varies significantly by surgical type, with certain procedures associated with disproportionately high burden. Evidence consistently indicates that abdominal, oncologic, and emergency surgeries are linked to elevated rates of postoperative anxiety and depression. Large-scale cohort data demonstrate that the incidence of new-onset postoperative depression varies across surgical categories, even after adjustment for clinical variables, supporting the existence of procedure-specific psychological risk profiles [29]. Similarly, systematic review evidence indicates that approximately 25% of patients undergoing stoma-related procedures experience clinically significant depressive symptoms, underscoring the psychological impact of functional and body image changes [30].

Early postoperative periods appear particularly critical. Studies in oncologic and pancreatobiliary populations report high levels of distress shortly after surgery, suggesting a narrow window for early identification and intervention [22,31]. In LMIC and UMIC settings, these risks are further amplified by structural factors such as financial burden, unmet care needs, and limited access to psychosocial support services [18]. This indicates that surgical complexity and healthcare context interact synergistically to influence psychological outcomes. Bariatric surgery represents another high-risk context in which psychological trajectories do not follow a simple linear course; longitudinal data indicate that while depressive symptoms may decrease over twelve months, levels of stress and anxiety increase significantly in the postoperative period, highlighting the complexity of psychological adaptation following metabolic procedures [32]. In emergency abdominal surgery, preexisting depression has been documented in approximately 17% of patients and is associated with trends toward higher rates of postoperative delirium, delayed analgesia tolerance, and increased readmission, underscoring the clinical relevance of psychological comorbidity in acute surgical contexts [33]. Evidence also supports the value of integrated approaches: in arthroplasty populations, multimodal analgesia protocols that address both pain and functional recovery have been shown to significantly reduce postoperative anxiety and depression in the short term compared to conventional analgesia alone [34], while nurse-led preoperative emotional preparation interventions have demonstrated feasibility and measurable improvement in anxiety, depression, and quality of life outcomes following total hip arthroplasty [35].

Table 1. Characteristics of included studies examining psychosocial determinants of postoperative psychological distress across surgical populations and global settings

Study	Country (income group)	Design	Sample size	Measures (distress & predictors)	Key findings
Stoop et al. (2025)	Netherlands (HIC)	Multicentre cross-sectional	733	Pain (NRS); Anxiety (VAS-A); Stress (PSS-10); Sleep (PROMIS)	High prevalence of anxiety (~38%), stress (~38%), and pain (~70%); supports routine PRO monitoring
Rekik et al. (2024)	Tunisia (UMIC)	Prospective observational	203	APAIS (anxiety); VAS (pain)	Anxiety prevalent (38.4%) despite mostly mild pain; no anxiety–pain correlation
ElBarazi (2024)	Egypt (LMIC/UMIC*)	Repeated cross-sectional	579	DASS-21 (depression, anxiety, stress)	Anxiety and stress increased at 12 months; depression decreased
Zhou et al. (2024)	China (UMIC)	Cross-sectional (≤5 days postop)	371	PHQ-9; STAI; PCS (catastrophizing)	High early postoperative anxiety; catastrophizing linked to depression risk
Oswald et al. (2022/2023)	Australia (HIC)	Prospective cohort	169	DASS-21; Distress Thermometer	Anxiety increased at discharge; preoperative distress predicted poorer mental QoL
O’Gara et al. (2023)	USA (HIC)	Retrospective cohort (claims data)	>100,000	ICD codes; antidepressant use	Incidence of new-onset postoperative depression varies by surgical type
Tegegne & Fentie (2022)	Ethiopia (LMIC)	Multicentre cross-sectional	386	PHQ-9; Oslo Social Support Scale	High postoperative depression; poor social support independently associated

Mony et al. (2025)	Bangladesh (LMIC)	Cross-sectional	203	HADS; pain score; socioeconomic variables	Postoperative depression common; associated with pain and perceived stress
Adamakidou et al. (2023)	Greece (HIC)	Longitudinal	86	DASS-21; MSPSS; unmet needs	Anxiety decreased over time; linked to changes in support-related needs
Majumdar et al. (2025)	USA (HIC)	Repeated-measures	75	Distress Thermometer; Ways of Coping	Escape-avoidance and social support coping predicted distress
Ma et al. (2024)	China (UMIC)	Cross-sectional	432	Distress screening tool; care demands	Distress associated with financial burden, gender, and care needs
Cheng et al. (2025)	China (UMIC)	Cross-sectional (latent profile)	210	Psychosocial Distress Questionnaire; resilience	Distinct distress profiles; low resilience linked to higher distress risk
Periñez & Castillo-Díaz (2025)	Brazil (UMIC)	Prospective observational	118	HADS; pain scale	Anxiety/depression predicted higher postoperative pain (bidirectional link)
Zou et al. (2025)	China (UMIC)	Cross-sectional	290	PHQ-9; LSNS-6 (social isolation)	Social isolation strongly associated with depression
Kovoor et al. (2023)	Multi-country	Systematic review & meta-analysis	20+ studies	Depression measures post-stoma	~25% report clinically significant depressive symptoms post-stoma
McCann et al. (2023)	Australia (HIC)	Narrative review	39 studies	Mixed distress and psychosocial factors	Social interaction and rehabilitation protective; pain/function increase distress
Rowe et al. (2025)	Multi-country	Systematic review	57 studies	Distress across perioperative timeline	Distress persists across perioperative period; supports repeated screening
Naeyaert et al. (2026)	Multi-country	Systematic review (interventions)	8 studies	Emotion regulation interventions	ER interventions improve distress; high attrition noted
Maroof et al. (2023)	UK (HIC)	Retrospective cohort	210	Depression history; postoperative outcomes	~17% depression prevalence in emergency abdominal surgery
Zheng et al. (2023)	China (UMIC)	Comparative cohort	161	HADS; functional outcomes	Multimodal analgesia improved psychological and recovery outcomes
Ripoll-Romero et al. (2025)	Multi-setting	Quasi-randomized trial	131	HADS; EQ-5D-5L	Nurse-led emotional preparation feasible; improved outcomes over time

HIC = High-income country; LMIC = Low- and middle-income country; UMIC = Upper-middle-income country. Country classifications were based on the World Bank Country and Lending Groups classification for the relevant fiscal year. Countries with transitional classifications (e.g., Egypt) were categorized according to the most appropriate classification during the study period. NR = Not reported.

DISCUSSION

This review synthesizes evidence indicating that postoperative psychological distress is not adequately explained by pain intensity alone. Pain does not function as a direct proxy for psychological well-being; it represents one component within a broader, multidimensional recovery process. Contemporary perioperative frameworks recognize recovery as a biopsychosocial phenomenon integrating physiological, psychological, and contextual domains [36,37].

The synthesis demonstrates that psychological distress may follow trajectories partially independent of nociceptive processes, consistent with emerging models in pain science such as fear-avoidance and cognitive–affective frameworks, where emotional and cognitive factors shape symptom perception and recovery outcomes [38]. From a clinical perspective, these findings challenge reliance on pain scores as surrogate indicators of recovery quality and support the integration of routine psychological assessment alongside physical evaluation.

A key contribution of this review lies in identifying psychosocial determinants, emotional regulation, coping processes, and perceived social support, as primary drivers of postoperative psychological outcomes. This aligns with broader psychological evidence linking maladaptive regulation strategies, including rumination and catastrophizing, to anxiety and depressive symptoms across clinical populations [39,40]. Emotional dysregulation may amplify threat perception, increase attentional bias toward symptoms, and impair adaptive coping during recovery.

Neurobiological evidence supports this relationship, showing that stress-related activation of limbic pathways modulates both emotional and pain processing systems [41]. This provides a mechanistic basis for the bidirectional association between pain and psychological distress without assuming a linear causal relationship. Perceived social support operates through complementary mechanisms. The stress-buffering model explains how support reduces the psychological impact of stressors by enhancing coping capacity and attenuating physiological stress responses [10,42]. Within surgical contexts, support also contributes to improved adherence to postoperative care, greater health literacy, and reduced uncertainty, reinforcing psychological stability during recovery.

Contextual and structural determinants play a critical role in shaping postoperative psychological outcomes. While psychosocial mechanisms are broadly consistent, their expression is mediated by health system capacity and socioeconomic conditions. In high-income countries, structured perioperative pathways incorporate prehabilitation, patient education, and multidisciplinary follow-up, which partially mitigate psychological risk [43]. Despite these advances, psychological distress remains prevalent, indicating that current models may not sufficiently address underlying cognitive and emotional processes. In low- and middle-income countries, distress is compounded by systemic constraints such as financial toxicity, limited access to care, and dependence on informal caregiving networks. Evidence from global surgery research demonstrates that these structural factors influence patient outcomes beyond clinical variables [44,45]. Psychological distress in these settings reflects both individual vulnerability and broader health system inequities. These findings have direct implications for clinical practice. Multidimensional assessment models incorporating validated psychological screening tools alongside routine physical monitoring are warranted. Instruments such as the Hospital Anxiety and Depression Scale and Patient Health Questionnaire can be integrated into perioperative workflows.

The identification of emotional regulation and coping as modifiable determinants underscores the value of targeted psychosocial interventions. Evidence indicates that cognitive-behavioral and mindfulness-based approaches can reduce perioperative anxiety and improve recovery outcomes [4,46], although challenges related to scalability and engagement remain, particularly in resource-limited settings. Strengthening social support systems is equally critical, encompassing structured caregiver involvement, discharge planning, and community-based support. In resource-constrained environments, interventions must address both emotional and material dimensions, including financial and access-related barriers. Risk stratification approaches integrating procedural and psychosocial factors enable early identification of high-risk patients, particularly in complex surgical pathways.

Several priorities for future research emerge. Longitudinal, theory-driven studies are needed to clarify causal pathways linking psychosocial factors, pain, and recovery outcomes, as current evidence is largely cross-sectional. The development of integrated conceptual models that incorporate cognitive, emotional, social, and structural determinants would advance understanding beyond isolated predictors. There is a need for context-sensitive research in low- and middle-income settings, where evidence remains limited despite substantial unmet surgical need. Intervention studies should incorporate implementation science frameworks to evaluate feasibility, acceptability, and scalability across diverse healthcare systems. This narrative review provides a comprehensive synthesis of psychosocial determinants of postoperative psychological distress across varied surgical populations and settings, offering a multidimensional perspective on recovery beyond traditional biomedical models. Limitations should be acknowledged. The interpretive nature of a narrative review introduces potential selection bias, heterogeneity in study designs and measures limits comparability, and reliance on predominantly observational data constrains causal inference.

CONCLUSIONS

In conclusion, postoperative psychological distress is a multifactorial phenomenon that cannot be adequately explained by pain alone. Emotional regulation, coping processes, social support, and contextual factors emerge as key determinants shaping recovery trajectories. These findings underscore the need to move beyond pain-centric models toward a comprehensive biopsychosocial approach to perioperative care. Integrating psychological assessment, targeted interventions, and context-sensitive strategies has the potential to significantly improve patient outcomes across global surgical settings.

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