



Review Article

POSTOPERATIVE PAIN AND PSYCHOLOGICAL DISTRESS: EXPLORING THE MIND-BODY CONNECTION IN SURGICAL NURSING

^{1*}Prashant Ajjappanavar, ²Anshul Garhpale, ³Sumit Kumar, ⁴Navneet Rajput, ⁵Mercy Jain, ⁶Anitha KC, ⁷Limna Mathew

¹KAHER Institute of Nursing Science, Belagavi, Karnataka, India

²LN Paramedical College, Indore, Madhya Pradesh

³Operation Theatre Technology, PW IOI School of Healthcare, Patna, Bihar

⁴ITM University, Gwalior, Madhya Pradesh, India

⁵Jabalpur Institute of Health Science, Jabalpur, Madhya Pradesh, India

⁶Tirumala College of Nursing, Nizamabad, Telangana, India

⁷Sai Nath College of Nursing, Katni, Madhya Pradesh, India

Article History: Received 23rd March 2026; Accepted 13th May 2026; Published 31st May 2026

ABSTRACT

Postoperative pain remains one of the most significant concerns in surgical care, often accompanied by psychological distress such as anxiety, depression, and fear. The interaction between physiological pain and psychological factors highlights the importance of the mind–body connection in recovery. This paper explores the relationship between postoperative pain and psychological distress, underlying mechanisms, assessment strategies, and the role of nursing interventions in improving patient outcomes. Evidence suggests that unmanaged psychological distress can amplify pain perception, delay recovery, and reduce patient satisfaction. Integrating holistic nursing care that addresses both physical and emotional needs is essential for optimal postoperative recovery.

Keywords: Postoperative pain, Psychological distress, Mind body connection, Surgical nursing, Anxiety.

INTRODUCTION

Postoperative pain remains a major clinical concern in surgical nursing, influencing not only physical recovery but also the psychological well-being of patients. Despite advances in anesthesia, analgesia, and surgical techniques, a significant proportion of patients continue to experience moderate to severe pain following surgery. This persistent issue reflects the complex and multifactorial nature of pain, which cannot be fully understood through a purely biomedical lens. Increasingly, researchers and clinicians recognize that postoperative pain is deeply intertwined with psychological distress, reinforcing the concept of the mind–body connection in healthcare (Gan, 2017). Pain, as defined by the International Association for the Study of Pain, is both a sensory and emotional experience associated with actual or potential tissue damage. This definition underscores that pain is not merely a physiological response but also a subjective experience shaped by

emotional, cognitive, and social factors. In the postoperative context, patients encounter not only tissue injury from surgical procedures but also emotional challenges such as fear of complications, uncertainty about recovery, and dependence on healthcare providers. These psychological responses can significantly influence how pain is perceived and reported (Apfelbaum *et al.*, 2003). The global burden of postoperative pain is substantial. Studies suggest that up to 80% of patients experience acute postoperative pain, with a considerable proportion reporting inadequate pain relief (Gan, 2017). Poorly managed pain has been associated with numerous adverse outcomes, including delayed wound healing, increased risk of complications, prolonged hospital stays, and higher healthcare costs. Moreover, inadequate pain control can contribute to the development of chronic postoperative pain, a condition that may persist for months or even years after surgery (Kehlet & Dahl, 2003). These findings

*Corresponding Author: Prashant Ajjappanavar, Final Year PG Student, KAHER Institute of Nursing Science, Belagavi, Karnataka, India. Email: prashantkajjappanavar@gmail.com.

highlight the urgent need for comprehensive pain management strategies that go beyond pharmacological interventions.

Psychological distress is equally prevalent among surgical patients, often manifesting as anxiety, depression, and stress. Preoperative anxiety, in particular, affects a large proportion of patients and is linked to increased postoperative pain intensity and analgesic requirements. Patients who enter surgery with heightened anxiety levels are more likely to experience exaggerated pain responses due to increased activation of the central nervous system and stress-related pathways (Spielberger, 1983). Similarly, postoperative depression can negatively affect recovery by reducing motivation, impairing sleep, and decreasing adherence to treatment plans. The coexistence of pain and psychological distress creates a cyclical relationship in which each condition exacerbates the other. The concept of the mind–body connection provides a useful framework for understanding this interaction. Rooted in the biopsychosocial model, this perspective emphasizes that health and illness are the result of dynamic interactions among biological, psychological, and social factors. In the context of surgical nursing, this means that effective postoperative care must address not only the physical aspects of pain but also the emotional and psychological needs of patients. Failure to do so may result in suboptimal outcomes and reduced patient satisfaction (Engel, 1977). Neurobiological research has further elucidated the mechanisms underlying the relationship between pain and psychological distress.

The experience of pain involves complex interactions between peripheral nociceptors and central nervous system pathways. Psychological factors such as anxiety and depression can modulate these pathways through processes like central sensitization, in which the nervous system becomes hypersensitive to stimuli. Additionally, stress activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to the release of cortisol and other stress hormones that can influence inflammation, immune function, and pain perception (McCaffery & Pasero, 1999). These findings demonstrate that psychological states are not merely reactions to pain but active contributors to its intensity and persistence. From a nursing perspective, the interplay between postoperative pain and psychological distress presents both challenges and opportunities. Nurses are often the primary caregivers responsible for monitoring patients' pain levels, administering analgesics, and providing emotional support. Their close and continuous interaction with patients places them in a unique position to assess both physical and psychological needs. However, traditional nursing practices have often prioritized physical symptoms over psychological well-being, leading to gaps in holistic care. Addressing this imbalance requires a shift toward integrated care models that recognize the importance of the mind–body connection. Assessment plays a critical role in managing postoperative pain and psychological distress. While standardized tools such as the Visual Analog Scale (VAS) and Numeric Rating Scale (NRS) are commonly used to measure pain intensity, they

may not capture the full complexity of the patient's experience. Similarly, psychological assessment tools like the Hospital Anxiety and Depression Scale (HADS) can help identify patients at risk of distress but are not always routinely implemented in surgical settings. Incorporating comprehensive assessment strategies that evaluate both physical and emotional dimensions of pain is essential for effective care (Apfelbaum *et al.*, 2003). In addition to assessment, intervention strategies must also reflect a holistic approach. Pharmacological treatments, including opioids and nonsteroidal anti-inflammatory drugs (NSAIDs), remain the cornerstone of postoperative pain management.

However, these interventions alone are often insufficient and may be associated with adverse effects such as nausea, sedation, and risk of dependency. Non-pharmacological approaches, including relaxation techniques, cognitive-behavioral therapy (CBT), and patient education, have been shown to reduce both pain and psychological distress. These interventions work by addressing the cognitive and emotional factors that influence pain perception, thereby complementing pharmacological treatments (Kehlet & Dahl, 2003). The role of communication in surgical nursing cannot be overstated. Effective communication between nurses and patients fosters trust, reduces anxiety, and enhances patient satisfaction. Providing clear information about surgical procedures, expected outcomes, and pain management strategies can help alleviate fear and uncertainty. Moreover, involving patients in decision-making processes empowers them and promotes a sense of control, which is particularly important in reducing psychological distress (Gan, 2017). Cultural and social factors also play a significant role in shaping patients' experiences of pain and distress. Cultural beliefs influence how pain is expressed, interpreted, and managed, while social support systems can either mitigate or exacerbate psychological stress.

In diverse populations, such as those encountered in countries like India, culturally sensitive care is essential for addressing these variations. Nurses must be aware of cultural differences and tailor their interventions accordingly to ensure equitable and effective care. Despite growing awareness of the mind–body connection, several barriers hinder its integration into clinical practice. These include limited training in psychological assessment, time constraints, and a lack of interdisciplinary collaboration. Additionally, healthcare systems often prioritize efficiency and cost-effectiveness over holistic care, further complicating efforts to address psychological needs. Overcoming these challenges requires organizational support, ongoing education, and the development of standardized protocols that incorporate both physical and psychological aspects of care. In recent years, there has been increasing interest in leveraging technology to improve postoperative care. Digital health tools, such as mobile applications and telehealth platforms, offer new opportunities for monitoring pain and psychological distress outside the hospital setting. These tools can facilitate early identification of complications, provide

educational resources, and enable remote support, thereby enhancing continuity of care. However, their effectiveness depends on accessibility, user engagement, and integration with existing healthcare systems.

Conceptual Framework: Mind Body Connection

The conceptual framework of the mind–body connection provides a comprehensive foundation for understanding the complex interaction between postoperative pain and psychological distress in surgical nursing. Traditionally, biomedical models focused primarily on physiological causes of pain, emphasizing tissue damage and nociceptive processes. However, such models fail to explain the variability in pain experiences among patients undergoing similar surgical procedures. The mind–body connection shifts this perspective by recognizing that pain is not solely a physical phenomenon but a multidimensional experience influenced by psychological and social factors. A central theoretical underpinning of this framework is the biopsychosocial model, first proposed by George L. Engel (1977). This model posits that health and illness result from the dynamic interaction of biological, psychological, and social components. In the context of postoperative care, biological factors include surgical trauma, inflammation, and physiological healing processes. Psychological factors encompass emotions, thoughts, beliefs, and coping mechanisms, while social factors involve family support, cultural influences, and environmental conditions. The integration of these dimensions provides a more holistic understanding of patient experiences and outcomes.

Within this framework, the mind and body are viewed as interconnected systems that continuously influence each other. Psychological states such as anxiety, fear, and depression can significantly alter physiological responses to pain. For example, anxiety can heighten pain perception by increasing attention to pain signals and amplifying neural processing within the central nervous system. Similarly, depression may lower pain thresholds and reduce an individual's ability to cope with discomfort. Conversely, persistent physical pain can contribute to emotional distress, creating a bidirectional relationship that reinforces both conditions. Neurobiological mechanisms further support the mind body connection. Pain perception involves complex interactions between peripheral nociceptors and central processing pathways in the brain and spinal cord. Psychological factors can modulate these pathways through processes such as central sensitization, where repeated or intense stimulation leads to increased responsiveness of neurons. This phenomenon explains why patients with heightened psychological distress may report greater pain intensity despite similar levels of tissue injury. Additionally, the activation of the hypothalamic-pituitary-adrenal (HPA) axis during stress results in the release of cortisol and other stress hormones, which can influence inflammation, immune function, and healing processes.

Cognitive processes also play a critical role in shaping the mind–body interaction. Patients' beliefs, expectations, and interpretations of pain can significantly affect their experiences. For instance, individuals who engage in

catastrophic thinking an exaggerated negative orientation toward pain are more likely to report higher pain levels and poorer outcomes. On the other hand, positive coping strategies, such as resilience and self-efficacy, can mitigate the impact of pain and enhance recovery. These cognitive factors highlight the importance of addressing patients' mental and emotional states as part of comprehensive care. Emotional regulation is another key component of the conceptual framework. Emotions such as fear and uncertainty are common in the perioperative period and can intensify both perceived pain and physiological stress responses. Effective emotional regulation strategies, including relaxation techniques and psychological support, can reduce sympathetic nervous system activation and promote a more balanced physiological state. This, in turn, can lead to improved pain control and faster recovery. Social context further enriches the understanding of the mind–body connection. Social support from family, friends, and healthcare providers can buffer the effects of stress and enhance coping. Patients who feel supported are more likely to adhere to treatment plans, communicate their needs, and engage in recovery activities. Cultural beliefs also influence how pain is perceived and expressed. In some cultures, stoicism is valued, leading patients to underreport pain, while in others, expressive communication of discomfort is more acceptable. Recognizing these variations is essential for delivering culturally competent care.

In surgical nursing practice, the mind–body conceptual framework emphasizes the need for holistic assessment and intervention. Nurses must evaluate not only the physical aspects of pain but also the psychological and social factors that may influence patient outcomes. This includes assessing anxiety levels, emotional well-being, coping strategies, and support systems. By identifying these factors early, nurses can implement targeted interventions that address both physical and psychological needs. The framework also supports the integration of multidisciplinary care. Collaboration among surgeons, anaesthesiologists, nurses, psychologists, and other healthcare professionals is essential for addressing the complex interplay of factors influencing postoperative pain. Such an approach ensures that patients receive comprehensive care that addresses all dimensions of their health. Moreover, the mind–body connection aligns with patient-centered care principles, which prioritize the individual needs, preferences, and values of patients. By acknowledging the subjective nature of pain and the influence of psychological factors, healthcare providers can tailor interventions to each patient's unique circumstances. This approach not only improves clinical outcomes but also enhances patient satisfaction and overall quality of care.

Postoperative Pain: Overview

Postoperative pain is an anticipated yet complex consequence of surgical intervention, arising as a direct result of tissue injury, inflammation, and physiological stress responses. Despite significant advancements in surgical techniques, anesthesia, and pain management

strategies, postoperative pain continues to be inadequately controlled in many patients worldwide. It remains one of the most common concerns reported by patients following surgery and is a critical indicator of the quality of perioperative care (Gan, 2017). Pain experienced after surgery is primarily acute in nature, typically beginning immediately after the procedure and lasting for a variable duration depending on the type and extent of surgery. Acute postoperative pain serves a protective physiological function by signaling tissue damage and promoting behaviors that facilitate healing, such as immobilization of the affected area. However, when poorly managed, acute pain can become maladaptive, leading to unnecessary suffering, complications, and delayed recovery. In some cases, it may progress into chronic postoperative pain, defined as pain that persists beyond the normal healing period, often lasting for more than three months (Kehlet & Dahl, 2003). The pathophysiology of postoperative pain involves a complex cascade of events initiated by surgical trauma. Tissue injury leads to the release of inflammatory mediators such as prostaglandins, bradykinin, and cytokines, which activate peripheral nociceptors. These pain signals are then transmitted through afferent nerve fibers to the spinal cord and brain, where they are processed and perceived as pain. Additionally, repeated or intense nociceptive stimulation can lead to central sensitization, a condition in which the central nervous system becomes hypersensitive, amplifying pain perception even in response to mild stimuli (McCaffery & Pasero, 1999). Postoperative pain can be classified based on its origin and characteristics. Somatic pain arises from skin, muscles, and soft tissues and is typically well localized and described as sharp or throbbing. Visceral pain, on the other hand, originates from internal organs and is often diffuse, poorly localized, and associated with autonomic symptoms such as nausea and sweating. Neuropathic pain may occur due to nerve injury during surgery and is characterized by burning, tingling, or shooting sensations. Understanding these different types of pain is essential for selecting appropriate management strategies.

Several factors influence the intensity and duration of postoperative pain. Surgical factors, such as the type, duration, and invasiveness of the procedure, play a significant role. For example, major abdominal or thoracic surgeries are generally associated with higher pain levels compared to minor procedures. Patient-related factors, including age, gender, genetic predisposition, and previous pain experiences, also contribute to variability in pain perception. Importantly, psychological factors such as anxiety, fear, and depression have been shown to significantly influence pain intensity, reinforcing the interconnected nature of physical and emotional health. Effective assessment of postoperative pain is a fundamental responsibility in nursing practice. Since pain is inherently subjective, self-reporting remains the gold standard for assessment. Commonly used tools include the Visual Analog Scale (VAS), Numeric Rating Scale (NRS), and Verbal Descriptor Scale (VDS). These tools allow healthcare providers to quantify pain intensity and monitor changes over time. However, reliance solely on numerical

scores may overlook the broader context of the patient's experience, including emotional and psychological dimensions. Therefore, comprehensive assessment should also consider behavioral cues, physiological indicators, and patient narratives. The consequences of inadequately managed postoperative pain are far-reaching. Physiologically, severe pain can activate the sympathetic nervous system, leading to increased heart rate, blood pressure, and oxygen consumption. It may also impair respiratory function by limiting deep breathing and coughing, thereby increasing the risk of complications such as atelectasis and pneumonia. Pain can hinder early mobilization, contributing to complications like deep vein thrombosis and delayed wound healing. Psychologically, persistent pain can lead to anxiety, sleep disturbances, and reduced overall well-being, further complicating recovery. Management of postoperative pain typically involves a multimodal approach that combines pharmacological and non-pharmacological interventions. Pharmacological treatments include opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), local anesthetics, and adjuvant medications. While effective, these treatments must be carefully administered to minimize side effects and complications. Multimodal analgesia, which involves the use of different classes of medications targeting various pain pathways, has been shown to improve pain control while reducing reliance on opioids. Non-pharmacological interventions also play a vital role in pain management. Techniques such as relaxation exercises, deep breathing, guided imagery, and music therapy can help reduce pain perception by promoting psychological comfort and reducing stress. Patient education is another important component, as informed patients are better prepared to manage their pain and participate actively in their recovery process. In the context of surgical nursing, managing postoperative pain requires a holistic and patient-centered approach. Nurses must not only administer medications but also assess pain comprehensively, provide emotional support, and advocate for effective pain management strategies. Recognizing the influence of psychological factors on pain perception is essential for delivering high-quality care.

Psychological Distress in Surgical Patients

Psychological distress is a common and often under recognized component of the surgical experience, significantly influencing patient outcomes before and after operative procedures. It encompasses a range of emotional states, including anxiety, depression, fear, stress, and uncertainty, which may arise at different stages of the surgical journey. While surgical care has traditionally emphasized physiological stabilization and recovery, growing evidence highlights the importance of addressing psychological well-being as an integral part of holistic patient care (Gan, 2017). Preoperative anxiety is one of the most prevalent forms of psychological distress among surgical patients. Studies indicate that a substantial proportion of patients experience moderate to high levels of anxiety prior to surgery, often related to fear of the unknown, concerns about anesthesia, potential

complications, and anticipated postoperative pain. According to Charles D. Spielberger (1983), anxiety can be conceptualized as both a temporary emotional state (state anxiety) and a more enduring personality trait (trait anxiety). In surgical settings, state anxiety is particularly relevant, as it fluctuates based on situational stressors such as hospitalization and impending procedures.

Elevated preoperative anxiety has been associated with increased pain perception, higher analgesic requirements, and prolonged recovery times (Apfelbaum *et al.*, 2003). Depression is another significant dimension of psychological distress that may affect surgical patients, particularly in the postoperative period. Factors such as prolonged hospitalization, limited mobility, dependence on caregivers, and concerns about recovery outcomes can contribute to depressive symptoms. Patients undergoing major or life-altering surgeries, such as amputations or cancer-related procedures, may be at an even higher risk. Depression not only affects emotional well-being but also has physiological implications, including impaired immune function, delayed wound healing, and reduced adherence to treatment regimens (Kehlet & Dahl, 2003). Stress is an inherent part of the surgical experience and is closely linked to both anxiety and depression. The stress response is mediated by the activation of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in the release of cortisol and other stress hormones. While this response is adaptive in the short term, prolonged or excessive stress can have detrimental effects on the body, including increased inflammation, suppression of immune function, and heightened pain sensitivity. These physiological changes can complicate recovery and increase the risk of postoperative complications (McCaffery & Pasero, 1999). Fear is another critical component of psychological distress in surgical patients. Fear may be related to various aspects of the surgical process, including fear of pain, disability, loss of independence, or even death. In some cases, fear may lead to avoidance behaviors, such as delaying or refusing necessary surgical interventions. Addressing these fears through effective communication and patient education is essential for reducing distress and promoting positive health outcomes. The interaction between psychological distress and postoperative pain is particularly significant. Psychological factors can influence pain perception through cognitive and emotional pathways. For example, patients who engage in catastrophic thinking characterized by exaggerated negative interpretations of pain tend to report higher pain intensity and greater functional impairment.

Conversely, patients with effective coping strategies and positive expectations are more likely to experience lower levels of pain and faster recovery. This bidirectional relationship underscores the importance of addressing psychological distress as part of comprehensive pain management. Social and cultural factors also play a vital role in shaping psychological responses to surgery. Social support from family, friends, and healthcare providers can act as a protective factor, reducing anxiety and promoting resilience. Patients who feel supported are more likely to

express their concerns, adhere to treatment plans, and engage actively in their recovery. Cultural beliefs and values influence how patients perceive illness, express emotions, and seek help. For instance, in some cultures, expressing emotional distress may be discouraged, leading to underreporting of symptoms and unmet psychological needs. Assessment of psychological distress is a crucial responsibility in surgical nursing practice. Standardized tools such as the Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory (BDI), and State-Trait Anxiety Inventory (STAI) are commonly used to identify patients at risk. Early identification allows for timely interventions, which may include counseling, relaxation techniques, cognitive-behavioral therapy, and, when necessary, pharmacological treatment. However, routine psychological assessment is not always integrated into surgical care, highlighting a gap that needs to be addressed. Nurses play a pivotal role in recognizing and managing psychological distress. Their continuous presence and close interaction with patients enable them to observe subtle changes in behavior, mood, and communication. Therapeutic communication, active listening, and empathetic care can significantly reduce anxiety and foster a sense of trust and security. Providing clear and accurate information about surgical procedures, expected outcomes, and pain management strategies can also alleviate uncertainty and fear (Gan, 2017). Interventions aimed at reducing psychological distress have shown promising results in improving surgical outcomes. Preoperative education programs, relaxation techniques, mindfulness-based interventions, and psychological counseling have been associated with reduced anxiety, lower pain levels, and shorter hospital stays. These approaches emphasize the importance of a holistic, patient-centered model of care that addresses both physical and emotional needs. Despite the recognized importance of psychological well-being, several barriers hinder its integration into routine surgical practice. These include time constraints, limited training in mental health assessment, and a lack of interdisciplinary collaboration. Addressing these challenges requires organizational support, education, and the development of standardized protocols that incorporate psychological care into surgical pathways.

Relationship between Pain and Psychological Distress

The relationship between postoperative pain and psychological distress is complex, bidirectional, and clinically significant in surgical nursing. Pain is not merely a physical sensation resulting from tissue injury; it is a subjective experience shaped by emotional, cognitive, and behavioral factors. Psychological distress including anxiety, depression, and stress can significantly influence how pain is perceived, interpreted, and managed, while persistent pain can, in turn, exacerbate emotional suffering (Gan, 2017). One of the key mechanisms underlying this relationship is the amplification of pain by psychological factors. Anxiety, for instance, heightens the body's state of alertness and increases attention to pain signals. Patients who are anxious tend to focus more intensely on their discomfort, leading to increased pain perception. Similarly,

individuals experiencing depression often have lower pain thresholds and reduced tolerance, making even mild stimuli feel more intense. According to International Association for the Study of Pain, pain inherently includes both sensory and emotional components, reinforcing the idea that psychological states are integral to the pain experience. Cognitive processes such as pain catastrophizing also play a critical role. Catastrophizing involves exaggerated negative thoughts about pain, including feelings of helplessness and anticipation of the worst outcomes. Patients who engage in such thinking patterns are more likely to report severe pain, increased disability, and prolonged recovery. This demonstrates how mental interpretations can directly influence physical experiences.

Conversely, unrelieved or poorly managed postoperative pain can contribute to psychological distress. Persistent pain can disrupt sleep, reduce mobility, and limit daily functioning, leading to frustration, anxiety, and depressive symptoms. Over time, this can create a vicious cycle in which pain increases distress, and distress further intensifies pain. This cycle not only affects the patient's quality of life but also delays healing and increases the risk of chronic pain development (Kehlet & Dahl, 2003). Neurobiological pathways further explain this interaction. Both pain and emotional distress share common neural circuits involving the brain, particularly areas responsible for emotion regulation and pain processing. Stress activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to the release of cortisol and other stress hormones that can enhance inflammation and sensitivity to pain. Additionally, neurotransmitters such as serotonin and dopamine, which regulate mood, also play a role in modulating pain perception (McCaffery & Pasero, 1999). From a clinical perspective, this interconnected relationship highlights the importance of holistic care in surgical settings. Effective pain management should not be limited to pharmacological interventions but must also address psychological factors through counseling, emotional support, and coping strategies. Early identification of distress and timely intervention can help break the pain-distress cycle and improve recovery outcomes.

Neurobiological Mechanisms

The relationship between postoperative pain and psychological distress is deeply rooted in complex neurobiological mechanisms involving the peripheral and central nervous systems, as well as neuroendocrine pathways. Pain perception is not a simple linear process but a dynamic interaction between sensory input and brain interpretation, influenced significantly by emotional and cognitive states. Understanding these mechanisms is essential for surgical nurses to appreciate how psychological factors can alter pain experiences and recovery outcomes. Following surgical injury, tissue damage triggers the release of inflammatory mediators such as prostaglandins, bradykinin, and cytokines. These substances activate peripheral nociceptors, initiating pain signals that travel through afferent nerve fibers to the spinal cord and ultimately to the brain. This process, known as

nociception, forms the biological basis of postoperative pain. However, the intensity and quality of pain perceived by the patient depend largely on how these signals are processed within the central nervous system. One of the key neurobiological processes involved is central sensitization. This occurs when repeated or intense nociceptive stimulation leads to increased excitability of neurons in the spinal cord and brain, resulting in an amplified response to pain stimuli. Patients experiencing psychological distress, such as anxiety or depression, are more susceptible to central sensitization, which can cause even mild stimuli to be perceived as painful. This explains why individuals with similar surgical injuries may report vastly different pain experiences (Kehlet & Dahl, 2003). The brain plays a central role in integrating pain and emotional responses. Regions such as the amygdala, prefrontal cortex, and anterior cingulate cortex are involved in both pain perception and emotional regulation. These shared neural circuits highlight the close connection between physical and psychological experiences. Emotional distress can enhance the activity of these brain regions, intensifying pain perception, while chronic pain can alter brain function, contributing to mood disorders. The neuroendocrine system, particularly the hypothalamic-pituitary-adrenal (HPA) axis, also plays a critical role in the mind-body interaction. Surgical stress activates the HPA axis, leading to the release of cortisol and other stress hormones. While this response is essential for maintaining homeostasis in the short term, prolonged activation can have adverse effects, including increased inflammation, impaired immune function, and delayed wound healing. Elevated cortisol levels have also been linked to heightened pain sensitivity and emotional disturbances (McCaffery & Pasero, 1999). Neurotransmitters such as serotonin, dopamine, and endorphins further modulate the relationship between pain and psychological distress. Serotonin and dopamine are involved in mood regulation and can influence pain perception, while endorphins act as natural analgesics that reduce pain and promote a sense of well-being. Imbalances in these neurotransmitters, often associated with anxiety and depression, can exacerbate both pain and emotional distress.

Nursing Interventions: A Holistic Approach

Effective management of postoperative pain and psychological distress requires a holistic approach that addresses the physical, emotional, cognitive, and social dimensions of patient care. In surgical nursing, holistic interventions are essential because pain perception is influenced not only by tissue injury but also by psychological and environmental factors. By integrating pharmacological and non-pharmacological strategies, nurses can provide comprehensive, patient-centered care that enhances recovery and overall well-being. Pharmacological management remains a cornerstone of postoperative pain control. Commonly used medications include opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), and local anesthetics. These agents target different components of the pain pathway, helping to reduce inflammation and block pain transmission.

Multimodal analgesia, which involves combining different classes of medications, is widely recommended as it provides better pain relief while minimizing side effects such as sedation, nausea, and respiratory depression (Gan, 2017). Nurses play a critical role in administering these medications safely, monitoring for adverse effects, and evaluating their effectiveness. However, pharmacological interventions alone are insufficient to address the psychological aspects of pain, highlighting the need for complementary strategies. Non-pharmacological interventions are vital components of holistic nursing care. Techniques such as deep breathing exercises, progressive muscle relaxation, guided imagery, and meditation can help reduce anxiety and promote a sense of calm. These methods work by decreasing sympathetic nervous system activity and enhancing the body's natural relaxation response. Music therapy and distraction techniques have also been shown to lower pain perception and improve patient comfort. Such interventions are simple, cost-effective, and can be easily incorporated into routine nursing practice. Cognitive-behavioral approaches are particularly effective in addressing the psychological dimensions of pain. Cognitive-behavioral therapy (CBT) helps patients identify and modify negative thought patterns, such as catastrophizing, that can intensify pain and distress. By promoting positive coping strategies and resilience, CBT can improve both emotional well-being and pain outcomes. Nurses, even without formal psychotherapy training, can apply basic cognitive-behavioral principles through supportive communication, reassurance, and patient education.

Patient education is another key aspect of holistic care. Providing clear and accurate information about surgical procedures, expected pain levels, and pain management strategies can significantly reduce anxiety and uncertainty. Educated patients are more likely to participate actively in their care, adhere to treatment plans, and use coping strategies effectively. Preoperative counseling, in particular, has been shown to decrease anxiety and improve postoperative outcomes (Apfelbaum *et al.*, 2003). Emotional support is fundamental to addressing psychological distress. Nurses, through their continuous presence and close interaction with patients, are uniquely positioned to offer empathy, reassurance, and encouragement. Therapeutic communication, including active listening and validation of patient concerns, helps build trust and fosters a supportive environment. Involving family members in the care process can further enhance emotional support, as familiar faces and social connections provide comfort and reassurance during recovery. Environmental factors also play a role in patient comfort and recovery. Creating a calm, quiet, and safe environment can reduce stress and promote healing. Simple measures such as minimizing noise, ensuring adequate lighting, and maintaining patient privacy contribute to a more positive hospital experience. Additionally, encouraging early mobilization, when appropriate, can help reduce complications and improve both physical and psychological outcomes. Cultural sensitivity is an important consideration in holistic nursing care. Patients' beliefs, values, and

cultural backgrounds influence how they perceive and express pain, as well as their attitudes toward treatment. Nurses must be aware of these differences and tailor their interventions accordingly. Respecting cultural preferences and incorporating culturally appropriate practices can enhance patient satisfaction and improve the effectiveness of care. Interdisciplinary collaboration is essential for delivering holistic care. Nurses must work closely with surgeons, anesthesiologists, physiotherapists, and mental health professionals to develop and implement comprehensive care plans. This collaborative approach ensures that all aspects of the patient's health are addressed, leading to better outcomes and more efficient use of healthcare resources.

Role of Surgical Nurses

Surgical nurses play a pivotal role in the management of postoperative pain and psychological distress, acting as key facilitators of holistic, patient-centered care. Their responsibilities extend beyond routine clinical tasks to include comprehensive assessment, timely intervention, emotional support, and coordination of multidisciplinary care. Given their continuous presence at the patient's bedside, surgical nurses are uniquely positioned to influence both physical recovery and psychological well-being. One of the primary responsibilities of surgical nurses is the assessment and monitoring of postoperative pain. Accurate pain assessment is essential for effective management, as pain is a subjective experience that varies widely among individuals. Nurses utilize standardized tools such as the Visual Analog Scale (VAS) and Numeric Rating Scale (NRS) to evaluate pain intensity, while also observing nonverbal cues such as facial expressions, body movements, and physiological indicators. Regular reassessment allows nurses to evaluate the effectiveness of interventions and make necessary adjustments in collaboration with the healthcare team (Gan, 2017). In addition to physical assessment, surgical nurses are responsible for identifying signs of psychological distress, including anxiety, depression, and fear. Early recognition of these symptoms is crucial, as psychological factors can significantly influence pain perception and recovery outcomes. Nurses must be attentive to changes in mood, behavior, and communication patterns, and use appropriate screening tools when necessary. By identifying distress early, they can initiate timely interventions or refer patients to mental health professionals for further support.

Administration and management of analgesic therapies are central to the nurse's role. Surgical nurses ensure the safe and effective delivery of prescribed medications, including opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), and adjuvant therapies. They monitor for side effects such as respiratory depression, nausea, and sedation, and take appropriate actions to prevent complications. Furthermore, nurses educate patients about the proper use of pain medications, addressing concerns about dependency and encouraging adherence to treatment plans. Beyond pharmacological management, surgical nurses implement a variety of non-pharmacological interventions to alleviate pain and reduce psychological distress. Techniques such as

relaxation exercises, deep breathing, guided imagery, and positioning are often initiated and supervised by nurses. These interventions not only complement medical treatment but also empower patients to take an active role in their recovery. Patient education is a key component of this process, as informed patients are better equipped to manage their symptoms and cope with the challenges of recovery (Apfelbaum *et al.*, 2003).

Therapeutic communication is another critical aspect of nursing care. By establishing trust and rapport, nurses create a supportive environment in which patients feel comfortable expressing their concerns and fears. Active listening, empathy, and reassurance can significantly reduce anxiety and promote a sense of security. Involving family members in the care process further enhances emotional support and contributes to positive outcomes. Surgical nurses also serve as coordinators of multidisciplinary care, collaborating with surgeons, anesthesiologists, physiotherapists, and psychologists to develop and implement comprehensive care plans. This collaborative approach ensures that both physical and psychological needs are addressed effectively. Additionally, nurses advocate for patients by communicating their needs and preferences to the healthcare team, ensuring that care remains patient-centered.

Implications for Nursing Practice

The growing recognition of the relationship between postoperative pain and psychological distress has significant implications for nursing practice, particularly in surgical settings. It necessitates a shift from a purely biomedical model to a more holistic, patient-centered approach that integrates physical, psychological, and social dimensions of care. For surgical nurses, this transformation requires enhanced clinical awareness, expanded competencies, and the adoption of evidence-based practices that address the mind-body connection. One of the most important implications is the need for comprehensive assessment. Nurses must go beyond routine pain scoring to include evaluation of psychological factors such as anxiety, depression, fear, and coping ability. While traditional tools like the Visual Analog Scale (VAS) measure pain intensity, integrating psychological screening tools such as the Hospital Anxiety and Depression Scale (HADS) can provide a more complete understanding of the patient's condition. Early identification of psychological distress allows for timely intervention, which can prevent complications and improve recovery outcomes (Gan, 2017). Another key implication is the integration of holistic care into routine nursing practice. Nurses must combine pharmacological pain management with non-pharmacological interventions, including relaxation techniques, cognitive-behavioral strategies, and emotional support. This approach recognizes that effective pain management cannot be achieved through medication alone. Instead, addressing the emotional and cognitive aspects of pain is essential for reducing its intensity and improving patient comfort. Incorporating these interventions into standard care protocols can enhance both clinical outcomes

and patient satisfaction. Education and training are also critical components of improving nursing practice. Many nurses may have limited formal training in psychological assessment and intervention, which can hinder their ability to address patients' emotional needs effectively. Ongoing professional development programs should focus on building skills in communication, psychological screening, and the application of non-pharmacological therapies. Training in culturally sensitive care is equally important, as cultural beliefs influence how patients perceive and express pain and distress. Interdisciplinary collaboration is another important implication. Managing postoperative pain and psychological distress requires coordinated efforts among healthcare professionals, including surgeons, anaesthesiologists, psychologists, and physiotherapists. Nurses play a central role in this team by facilitating communication, coordinating care plans, and ensuring continuity of care. Effective collaboration can lead to more comprehensive and individualized treatment strategies, ultimately improving patient outcomes. Patient education should be emphasized as a core nursing responsibility. Providing patients with clear information about surgical procedures, expected pain levels, and coping strategies can reduce anxiety and enhance their ability to manage pain. Preoperative counseling, in particular, has been shown to improve postoperative outcomes by preparing patients mentally and emotionally for surgery (Apfelbaum *et al.*, 2003). Educated patients are more likely to adhere to treatment plans, participate actively in their recovery, and report higher satisfaction with care. Healthcare systems and policies must also support the integration of holistic care. This includes developing standardized protocols that incorporate psychological assessment and intervention into surgical care pathways. Adequate staffing, time allocation, and resource availability are essential for enabling nurses to provide comprehensive care. Additionally, the use of digital health technologies, such as mobile applications for pain and mood monitoring, offers new opportunities to enhance patient care and follow-up.

CONCLUSION

Postoperative pain and psychological distress are closely interconnected phenomena that significantly influence patient recovery and overall well-being. This review highlights that pain is not solely a physical experience but is deeply shaped by emotional and psychological factors such as anxiety, fear, and depression. When psychological distress is left unaddressed, it can intensify the perception of pain, delay healing, and prolong hospital stays, and negatively impact patient satisfaction and quality of life. Therefore, understanding the mind-body connection is essential in providing effective and comprehensive postoperative care. Nurses play a pivotal role in recognizing and managing both the physical and psychological dimensions of postoperative recovery. Through continuous assessment, empathetic communication, and evidence-based interventions, nurses can identify early signs of distress and implement strategies to alleviate both pain and emotional burden. Non-

pharmacological approaches such as relaxation techniques, patient education, counselling, and emotional support have proven to be valuable complements to pharmacological pain management. Furthermore, adopting a holistic and patient-centred approach ensures that care is tailored to individual needs, promoting faster recovery and better health outcomes. Interdisciplinary collaboration among healthcare professionals also enhances the quality of care by addressing multiple aspects of patient health simultaneously. Integrating psychological care with routine pain management is not optional but necessary in modern surgical nursing practice. Future research and clinical practice should continue to focus on innovative and holistic strategies that bridge the gap between physical and emotional care. By doing so, healthcare providers can improve recovery experiences and ensure more effective, compassionate, and comprehensive postoperative care.

ACKNOWLEDGMENT

The authors express sincere thanks to the Head of the KAHER Institute of Nursing Science, Belagavi, Karnataka, India for the facilities provided to carry out this research work.

CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

FUNDING

This study received no specific funding from public, commercial, or not-for-profit funding agencies.

AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

REFERENCES

- Apfelbaum, J. L., Chen, C., Mehta, S. S., & Gan, T. J. (2003). Postoperative pain experience: Results from a national survey suggest postoperative pain continues to be undermanaged. *Anesthesia & Analgesia*, 97(2), 534–540. <https://doi.org/10.1213/01.ANE.0000068822.10113.9E>.
- Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, 196(4286), 129–136. <https://doi.org/10.1126/science.847460>.
- Gan, T. J. (2017). Poorly controlled postoperative pain: Prevalence, consequences, and prevention. *Journal of Pain Research*, 10, 2287–2298. <https://doi.org/10.2147/JPR.S144066>.
- Kehlet, H., & Dahl, J. B. (2003). Anaesthesia, surgery, and challenges in postoperative recovery. *The Lancet*, 362(9399), 1921–1928. [https://doi.org/10.1016/S0140-6736\(03\)14966-5](https://doi.org/10.1016/S0140-6736(03)14966-5).
- McCaffery, M., & Pasero, C. (1999). *Pain: Clinical manual* (2nd ed.). Mosby.
- Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory (STAI)*. Consulting Psychologists Press.

