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The Role of Preoperative Psychological Factors in Postoperative Recovery in Adult Patients

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Abstract

Objective: This systematic review aims to investigate the role of preoperative psychological factors in postoperative recovery following major elective surgical procedures in adult patients.

Methods: A systematic search was conducted in PsycINFO, Medline and Eric databases. We included articles published in the last 10 years that included patients aged 18 years and older who underwent major elective surgical procedures. Data extracted from the studies include each study's author(s), publication year, study design, key psychological factor, postoperative outcome(s), and significant findings.

Results: 1930 articles were screened for title and abstract relevance. After initial screening and full-text analysis, 32 articles were included in the systematic review. Articles examined 4 preoperative psychological factors in relation to postoperative recovery, namely: depression (n = 17), anxiety, (n = 17), personality-related factors (n = 7), and resilience (n = 9). Depression and anxiety were consistently associated with adverse postoperative outcomes, including increased pain, compromised functional recovery, longer hospital stays, and poorer quality of life. Personality-related factors were found to influence surgical recovery, complications, patient engagement in rehabilitation, and overall quality of life, with some personality traits positively affecting these outcomes and others having a more negative impact. Additionally, resilience emerged as a critical factor in promoting positive postoperative recovery trajectories.

Conclusions: Addressing preoperative psychological factors, including depression, anxiety, personality-related factors, and resilience, is essential in prehabilitation interventions to optimize patient satisfaction, well-being, and recovery outcomes. Further research is recommended to develop personalized interventions tailored to individual patient needs.

The Role of Preoperative Psychological Factors in Postoperative Recovery in Adult Patients

Prehabilitation, defined as the process to enhance general health and well-being of patients prior to major surgery, has gained increasing recognition since the early 2000s. This preparatory measure holds great promise, as evidenced by its significant contributions to improved surgical outcomes for patients, including reduced postoperative complications, shorter hospital stays, and enhanced overall recovery (van der Zanden et al., 2022; Driessens et al., 2024).

Traditionally, prehabilitation has predominantly concentrated on improving physical aspects such as nutrition, physical fitness, and lifestyle choices such as alcohol use and smoking (Durrand et al., 2019). However, recent insights suggest an evolving paradigm that acknowledges the significant role of psychological factors in preoperative preparation and postoperative recovery (Driessens et al., 2024). The preoperative period is an opportune time to enhance patients' functional and psychological status, as they are motivated to change their health behaviors to improve surgical outcomes (Schierbeck, 2022). A key component of prehabilitation is patient engagement and activation in their own health care, fostering empowerment and providing an opportunity to regain control over their health and recovery, thereby alleviating feelings of stress and anxiety often reported before surgery (Schierbeck, 2022).

Highlighting the increasing consideration of psychological factors in the context of prehabilitation, Mijderwijk et al. (2018) advocate for the integration of psychological factors into prehabilitation programs, emphasizing the significance of empowering patients to identify and manage their psychological well-being to improve postoperative outcomes. For instance, integrating psychological interventions such as cognitive-behavioral therapy into prehabilitation programs has shown promising results in empowering patients to reduce

anxiety and enhance coping mechanisms during the surgical journey (Mijderwijk et al., 2018).

Psychologists play a crucial role in prehabilitation teams, contributing to patient preparation by promoting healthy behaviors and delivering essential psychological interventions (Crowe et al., 2023). As integral members of interprofessional prehabilitation teams (Durrand et al., 2019), psychologists can provide invaluable support in addressing patients' psychological needs and enhancing overall well-being throughout the preoperative phase. Recent findings indicate a trend towards improved psychological outcomes following prehabilitation interventions, particularly when led by psychologists (Grimmett et al., 2022).

Despite the recognition of psychological factors in prehabilitation, there remains a research gap regarding the specific role of preoperative psychological factors in postoperative recovery. Therefore, this study aims to examine preoperative psychological factors in relation to postoperative recovery by means of a comprehensive overview of the existing literature. We anticipate that the insights gained from this review will not only inform the development of integrated prehabilitation programs that address both psychological and physical dimensions, but also contribute to the overarching goal of optimizing patient care and well-being in the postoperative period.

Methods

Eligibility Criteria

The criteria for inclusion in this systematic review encompassed various types of studies focused on different psychological factors affecting postoperative recovery. Studies used in this systematic review included patients that were aged 18 years and older. The decision to include studies published within the last 10 years was motivated by the rapid development of this field, ensuring the inclusion of recent insights.

Search Strategy

To identify relevant sources for the study, a systematic search was conducted using PsycINFO, encompassing the databases MedLine and Eric. Search terms were categorized into three main groups: 'Surgery', 'Surgical outcomes', and 'Psychological factors'. Each term and its synonyms were entered separately and then combined using 'AND' and 'OR' Boolean operators. Parentheses were used to group terms, ensuring multiple words were searched as a cohesive unit. A comprehensive overview of the search query is presented in Appendix A.

Data Collection and Analysis

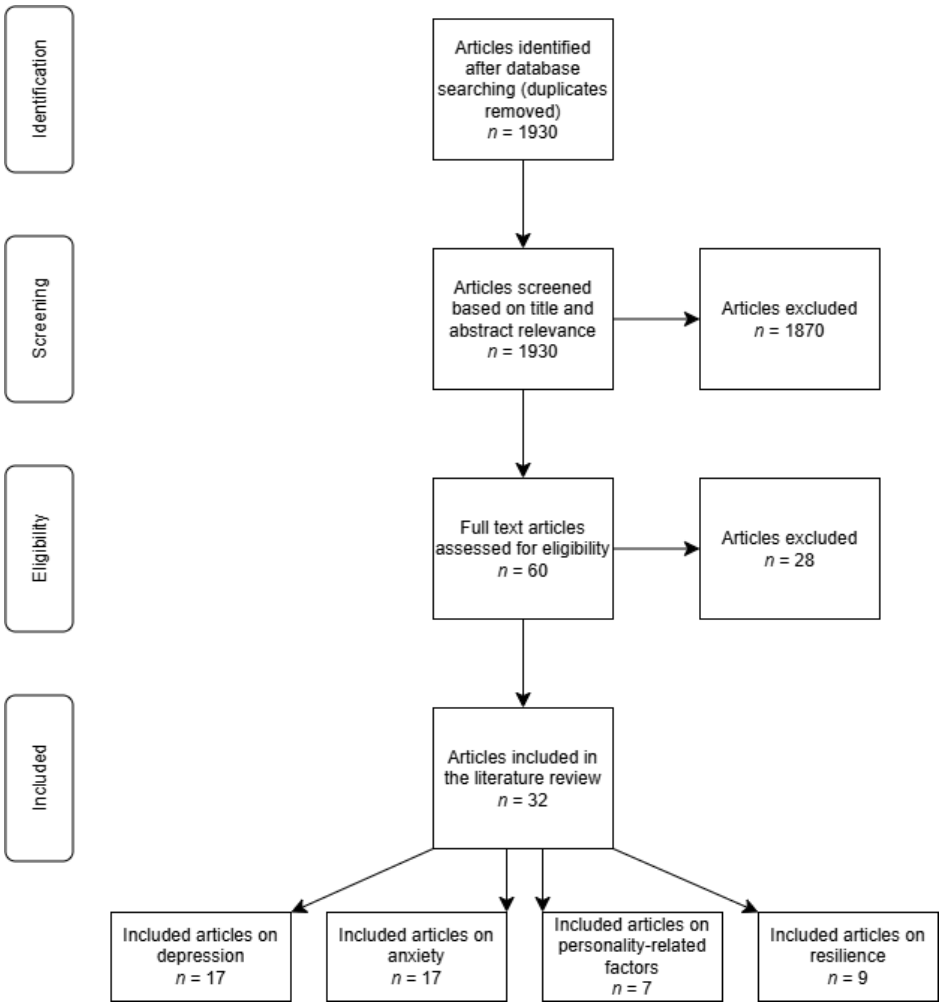
First, articles were screened on title and abstract using Rayyan, a software tool used for systematic reviews. Articles that passed the title abstract screening were screened full-text. A data extraction table was compiled to provide an overview of the final selection of studies, including each study's author(s), publication year, study design, key psychological factor, postoperative outcome(s), and statistical findings of the relation between psychological factors and postoperative outcomes. Due to the vast amount of literature available, this systematic review will focus on discussing a number of examples extracted from the most relevant sources related to psychological factors in prehabilitation and postoperative recovery.

Results

Study Selection

The search strategy extracted 1930 articles after removing duplicates (Figure 1). Title and abstract screening led to the selection of *n* = 60 studies for full-text review. Of these, 32 studies were included in the review (Figure 1). We categorized the included studies into four psychological key topics: Depression (*n* = 17), Anxiety (*n* = 17), Personality-Related Factors (*n* = 7) and Resilience (*n* = 9). A comprehensive overview of all the analyzed sources and significant findings can be found in the data extraction table, which serves as a comprehensive resource for reference and further analysis (Appendix B).

Figure 1: *Flowchart of the Study Selection Process*



Depression

Preoperative depression is intricately linked to several postoperative outcomes, as evidenced by the literature reviewed (n = 17). Findings on the influence of preoperative depression were categorized into four main outcome measures: postoperative pain (n = 11), functional recovery (n = 8), postoperative quality of life (n = 8), and surgical complications and long-term postoperative recovery (n = 8).

Preoperative Depression and Postoperative Pain

The association between preoperative depression and postoperative pain was explored in 11 of the included studies. Most studies demonstrated a significant relationship between preoperative depression and various aspects of postoperative pain, including chronicity (n = 4), intensity (n = 7), experience and perception (n = 2), and management (n = 3). Although Coronado et al. (2018) reported only a moderate correlation without a significant association, the overall evidence underscores the relationship between preoperative depression and postoperative pain.

Preoperative depression is a predictor of chronic pain following surgery, with depressed individuals at higher risk for chronic postsurgical pain and pain-related symptoms (Levett & Grimmet, 2019; Khatib et al., 2015; Ditton et al., 2020; Pan et al., 2019). Additionally, preoperative depression is associated with heightened postoperative pain intensity, as demonstrated in multiple studies (Khatib et al., 2015; Suffeda et al., 2016; Zhou et al., 2021; Ditton et al., 2020; Panatonni et al., 2022; Theologis et al., 2016; Alattas et al., 2017). For instance, Khatib et al. (2015) found that this heightened pain intensity may persist for up to two years after surgery. Furthermore, preoperative depression correlates with increased pain perception, reduced pain tolerance, and increased pain catastrophizing, which can exacerbate recovery challenges (Suffeda et al., 2016; Abraham et al., 2020).

Moreover, preoperative depression poses challenges to postoperative pain management, resulting in poorer pain relief and smaller improvements in pain postoperatively (Zhou et al., 2021; Ditton et al., 2020; Alattas et al., 2017).

Preoperative Depression and Functional Recovery

The association between preoperative depression and functional recovery was examined in 8 of the included studies. Most studies indicated an association between preoperative depression and poorer functional outcomes, with one exception (Coronado et al., 2018). A multicenter study by Theologis et al. (2016) found that depressed patients exhibited greater postoperative functional disability compared to non-depressed individuals. Specifically, preoperative depression predicts adverse functional recovery after total knee arthroplasty, with depressed patients showing reduced function, worse knee stiffness, and higher disability levels up to 5 years postoperatively (Khatib et al., 2015; Ditton et al., 2020; Alattas et al., 2017). Depression is also associated with greater disability, lower satisfaction, and worse patient-reported postoperative function and disability in patients having undergone surgery for adult spinal deformity (Lafage et al., 2021). Furthermore, it correlates with reduced engagement in rehabilitation programs, leading to diminished postoperative functional capacity (Panatonni et al., 2022; Abraham et al., 2020).

Preoperative Depression and Postoperative Quality of Life

All studies found preoperative depression to be significantly related to postoperative quality of life (QoL) (n = 8). While Lee et al. (2018) found that preoperative depressive symptoms substantially decrease QoL postoperatively, Ditton et al. (2020) observed a correlation with poorer QoL during recovery. Additionally, poor management of depression can contribute to decreased QoL (Abraham et al., 2020). Baseline depression scores predict postoperative depression (Mijderwijk et al., 2018), and Gorini et al. (2022) demonstrated a

negative impact on health-related QoL three months post-surgery. Although one study reported similar QoL improvements between depressed and non-depressed patients postoperatively (Theologis et al., 2016), overall, a consistent association between preoperative depression and poorer postoperative QoL emerged.

Preoperative Depression and Surgical Complications and Postoperative Recovery

The association between preoperative depression and surgical complications and postoperative recovery was investigated in 8 of the included studies. Specifically, preoperative depression was associated with general surgical recovery outcomes (n = 6), length of hospital stay (n = 5), and postoperative complications (n = 3). Patients with preoperative depressive symptoms often face longer recovery periods and lower recovery ratios compared to non-depressed patients (Zhou et al., 2021). Preoperative depression also correlates with longer critical care stays and greater postoperative opioid use (Scantling-Birch et al., 2021), potentially hindering recovery progress. Additionally, preoperative depression is associated with poorer motivation and adherence to rehabilitation interventions, leading to slower recovery (Ditton et al., 2020; Tolk et al., 2019).

However, there is conflicting evidence regarding the relationship between preoperative depression and length of hospital stay. While some studies found no significant effects of depression symptoms on hospital stay duration (Pan et al., 2019; Gorini et al., 2022), others indicate that depressed patients tend to have longer hospital stays compared to non-depressed individuals (Zhou et al., 2021; Ditton et al., 2020). Poor management of depression can also contribute to longer hospital stays (Abraham et al., 2020). Additionally, preoperative depression significantly increases the risk of various postoperative complications, including acute renal failure, myocardial infarction, and stroke (Pan et al., 2019). This risk is further heightened by suboptimal management of depression (Abraham et al., 2020), which can exacerbate medical comorbidities such as diabetes and hypertension

(Zhou et al., 2021).

Anxiety

Preoperative anxiety is closely associated with several postoperative outcomes, as supported by the reviewed literature (n = 17). Findings regarding the impact of preoperative anxiety were categorized into four main outcome measures: postoperative pain (n = 9), surgical complications and length of hospital stay (n = 6), postoperative quality of life (n = 8), and functional recovery and long-term surgical outcomes (n = 9).

Preoperative Anxiety and Postoperative Pain

The association between preoperative anxiety and postoperative pain was explored in 9 of the included studies. Most studies showed a significant relationship between preoperative anxiety and various elements of postoperative pain, further categorized into pain chronicity (n = 3), pain intensity (n = 5), and pain perception (n = 3). Although Coronado et al. (2018) reported no significant association between preoperative anxiety and postoperative pain, the prevailing evidence indicates a clear link between the two. Preoperative anxiety predicts postoperative pain chronicity, with doubled risks of chronic postoperative pain and higher incidences of pain-related symptoms (Levett & Grimmett., 2019; Ditton et al., 2020; Pan et al., 2019). Moreover, preoperative anxiety can also affect postoperative pain intensity experienced by patients (Ditton et al., 2020; Panatonni et al., 2022; Reyes-Gilabert et al., 2017; Suffeda et al., 2016; Alattas et al., 2017). Patients with preoperative anxiety often experience an increased pain severity immediately following surgery and higher pain severity overall, particularly in procedures like total knee arthroplasty and rotator cuff surgery (Ditton et al., 2020; Alattas et al., 2017; Panatonni et al., 2022). Trait anxiety appears to be the type of anxiety most often associated with more severe postoperative pain (Suffeda et al., 2016). Furthermore, preoperative anxiety also

alters pain perception, heightening sensitivity to pain and reducing pain tolerance postoperatively (Panatonni et al., 2022; Abraham et al., 2020; Reyes-Gilabert et al., 2017).

Preoperative Anxiety and Surgical Complications and Length of Hospital Stay

The association between preoperative anxiety and surgical complications and length of hospital stay was examined in 6 of the included studies, where nearly all studies found a significant relationship. Preoperative anxiety predicts short-term operative outcomes and compromises surgical results (Levett & Grimmett, 2019; Reyes-Gilabert et al., 2017). Poor management of preoperative anxiety may increase the risk of postoperative complications (Abraham et al., 2020). Patients with preoperative anxiety exhibit higher odds ratios for complications such as anemia, myocardial infarction, pneumonia, and stroke (Pan et al., 2019). Additionally, anxiety exacerbates uncomfortable postoperative symptoms such as nausea, vomiting, and insomnia, further raising complication risks (Reyes-Gilabert et al., 2017). Preoperative anxiety also correlates with longer hospital stays (Levett & Grimmett, 2019; Abraham et al., 2020, Gorini et al., 2022). Preoperative state anxiety shows a moderate positive correlation with total critical care stay (Scantling-Birch et al., 2021). Contrary to the researchers' expectations, one study found that patients without anxiety had longer hospital stays than those with anxiety (Pan et al., 2019).

Preoperative Anxiety and Postoperative Quality of Life

The association between preoperative anxiety and postoperative quality of life (QoL) was investigated in 8 of the included studies. Outcomes were divided into specific QoL outcomes ($n = 6$) and more general psychological well-being outcomes ($n = 4$). All studies found preoperative anxiety significantly related to postoperative QoL (Levett & Grimmett, 2019; Abraham et al., 2020; Gorini et al., 2022; Reyes-Gilabert et al., 2017; Alattas et al., 2020; Beisland et al., 2020). Persistent preoperative anxiety can diminish patients'

postoperative QoL by decreasing their ability to engage in daily activities, social interactions, and work responsibilities (Reyes–Gilabert et al., 2017). Elevated preoperative anxiety levels predict worse health-related QoL outcomes, even up to one year post-surgery (Alattas et al., 2017; Beisland et al., 2020). Stress management interventions could enhance postoperative QoL, suggesting the benefits of addressing preoperative anxiety (Levett & Grimmett., 2019). Preoperative anxiety also negatively influences more general outcomes of overall psychological well-being, including higher levels of avoidant and emotional coping, increased emotional distress, and compromised overall well-being (Mijderwijk et al., 2018; Reyes-Gilabert al., 2017; Babińska et al., 2017; Beisland et al., 2020).

Preoperative Anxiety and Functional Recovery and Long-Term Surgical Outcomes

The association between preoperative anxiety and functional recovery and long-term surgical outcomes was explored in 9 of the included studies. One study found no significant association between preoperative anxiety and postoperative function or disability in multiple prospective studies (Coronado et al., 2018). Overall, studies reveal a consistent correlation between preoperative anxiety and decreased functional recovery post-surgery, with adverse outcomes such as increased functional limitations, poorer physical functioning, and slower recovery across various procedures (Alattas et al., 2017; Ditton et al., 2020; Panatonni et al., 2022; Roh et al., 2014). Untreated anxiety can impede patients' participation in rehabilitation programs, potentially leading to decreased functional capacity and prolonged recovery periods (Abraham et al., 2020). Moreover, anxiety's negative impact on the body's natural healing processes may exacerbate postoperative symptoms, further hindering recovery efforts (Reyes-Gilabert et al., 2017). Regarding long-term surgical outcomes, there is variability in the influence of preoperative anxiety across different procedures and timeframes (Ditton et al., 2020; Aylward et al., 2022; Tolk et al., 2019). While some studies suggest potential longer-term impacts extending up to a decade after the procedure (Ditton

et al., 2020; Aylward et al., 2022), another study found no significant relationship between preoperative anxiety and long-term postoperative outcomes (Tolk et al., 2019).

Personality-Related Factors

Across the literature, several studies assessed the association between preoperative personality-related factors and postoperative outcomes (n = 7). Personality traits have emerged as potential predictors of various postoperative aspects, including surgical recovery and complications (n = 4), patient engagement in rehabilitation (n = 2), and health-related quality of life (n = 1).

Preoperative Personality Traits and Surgical Recovery and Postoperative Complications

Personality traits play a significant role in shaping surgical outcomes, with factors such as self-efficacy, motivation, ego strength, and coping skills influencing recovery trajectories (Levett & Grimmett., 2019). Patients with higher levels of self-efficacy and a positive outlook tend to experience earlier functional recovery, while inadequate coping skills and low self-esteem may negatively impact surgical outcomes (Levett & Grimmett., 2019). Additionally, individuals with personality traits that influence internalizing or externalizing behaviors may face specific challenges post-surgery, such as mood disturbances or maladaptive behaviors (Marek et al., 2013). Personality traits also contribute to the likelihood of postoperative complications, with higher neuroticism and lower conscientiousness being identified as significant risk factors for conditions like postoperative delirium (Shin et al., 2016). Patients with these traits may experience longer postoperative stays and heightened vulnerability to complications such as a delirium, underscoring the importance of considering preoperative personality factors in prehabilitation. One study found that optimism and other personality traits did not significantly predict postoperative expectations in knee replacement surgery, highlighting

the complexity of personality influences on recovery (Tolk et al., 2019).

Preoperative Personality Traits and Patient Engagement in Rehabilitation

Patient engagement in rehabilitation programs is crucial for successful postoperative recovery, and studies found personality traits significantly influence this engagement (*n* = 2). Interventions aimed at enhancing patients' perceived knowledge and self-efficacy can positively impact engagement in postoperative activities and rehabilitation programs (Gonella et al., 2021). Additionally, trends suggest that preoperative exercise may maintain or improve self-efficacy expectations post-surgery, potentially enhancing long-term exercise adherence and influencing surgical outcomes (Brown et al., 2014). Enhanced self-efficacy may contribute to better patient engagement in rehabilitation and long-term exercise adherence and positively influence postoperative outcomes.

Preoperative Personality Traits and Postoperative Quality of Life

Personality traits, particularly levels of neuroticism, have been consistently linked to health-related quality of life (HRQoL) and distress levels in patients undergoing surgical procedures (Beisland et al., 2020). Higher levels of neuroticism are associated with poorer HRQoL and increased distress, highlighting the need for tailored interventions to address individual coping mechanisms and enhance postoperative well-being (Beisland et al., 2020).

Resilience

This section explores the role of resilience in postoperative recovery, drawing insights from 9 studies. Resilience, defined as psychological flexibility (Beeckman et al., 2021) and the ability to adapt and bounce back from stressors (Ditton et al., 2020), is a significant predictor of various postoperative outcomes, including postoperative recovery (*n* = 6), postoperative pain (*n* = 3), postoperative quality of life (*n* = 2), psychological

well-being and coping strategies (n = 4), and resilience as a protective factor against surgical stressors (n = 5).

Preoperative Resilience and Postoperative Recovery

All studies found a significant association between preoperative resilience and postoperative recovery (n = 6). Higher baseline resilience is significantly associated with enhanced postoperative recovery, reduced complications, treatment adherence, and greater post-rehabilitation functional independence (Shan et al., 2023; Chen et al., 2020; Ditton et al., 2020). For instance, higher resilience levels are significantly associated with better postoperative knee function and general physical health after total knee arthroplasty (Nwankwo et al., 2021). Beeckman et al. (2021) found that while psychological resilience did not predict recovery in physical activity, it promoted adaptive recovery, emphasizing the importance of resilience-focused interventions. Janssen et al. (2019) investigated the influence of frailty and resilience on postoperative complications. Frailty is characterized by physical vulnerability and decreased resilience, and poses significant challenges to postoperative recovery. Frail individuals are at higher risk of experiencing major postoperative complications, including delirium, leading to longer hospital stays and increased rates of readmission (Janssen et al., 2019).

Preoperative Resilience and Postoperative Pain

Most studies found a significant association between preoperative resilience and postoperative pain (n = 3). Resilience acts as a protective factor for various health outcomes, including lower levels of pain-related disability, less pain catastrophizing, and reduced pain-related fear (Ditton et al., 2020). Moreover, psychological resilience before surgery and acceptance of postsurgical pain predict more favorable pain outcomes (Beeckman et al., 2021). Although one study did not find a direct association between resilience and

postoperative pain in a multivariate analysis, it did find that resilience mitigates the impact of depression and anxiety on pain perception (Suffeda et al., 2016). Resilience may contribute to a more adaptive psychological response to pain, potentially reducing pain severity or distress despite depressive or anxious symptoms.

Preoperative Resilience and Postoperative Quality of Life

Preoperative resilience significantly contributes to postoperative QoL outcomes (n = 2). Psychological flexibility and acceptance of postoperative pain predict more favorable recovery in health-related QoL (Beeckman et al., 2021). Conversely, low psychological resilience can negatively impact various postoperative outcomes, including quality of life. Enhancing psychosocial resilience can, in turn, improve QoL (Chen et al., 2020).

Preoperative Resilience and Psychological Well-Being and Coping Strategies

Resilience significantly influences psychological well-being and coping strategies post-surgery (Chen et al., 2020). Factors such as hope and self-efficacy are predictors of better resilience trajectories and can improve patients' mental health (Shan et al., 2023). Resilient individuals exhibit fewer anxiety and depressive symptoms and demonstrate adaptive coping mechanisms, such as effective engagement with social support and optimism (Ditton et al., 2020). While resilience may not be easily influenced by interventions, understanding its role is crucial for comprehensively addressing patients' psychological responses to surgery and recovery (Gonella et al., 2021).

Preoperative Resilience as a Protective Factor Against Surgical Stressors

Resilience acts as a protective factor against surgical stressors, influencing patients' ability to handle stress and facilitating beneficial responses after surgery (n = 5). Positive psychological functioning, including self-efficacy and resilience, can protect against

negative influences and optimize postoperative outcomes (Coronado et al., 2018). Frailty can affect resilience, making coping with surgical stressors challenging, underscoring the importance of preoperative interventions aimed at addressing frailty and optimizing resilience-related outcomes (Janssen et al., 2019). Overall, patients with higher levels of resilience are likely to handle surgery-related stressors better than those with negative perceptions (Nwankwo et al., 2021).

Discussion

This systematic review aimed to examine the role of preoperative psychological factors in postoperative recovery in adult patients following major elective surgery. We identified four key psychological determinants: depression, anxiety, personality-related factors, and resilience. Preoperative depression and anxiety were significantly related to postoperative pain, functional disability, lower engagement in rehabilitation, and an increased risk of complications, with mixed findings on their influence on length of hospital stay. Personality-related factors had both positive and negative effects on surgical outcomes. Traits like self-efficacy, motivation, and a positive outlook enhanced recovery and engagement in rehabilitation, while high neuroticism and low conscientiousness increased complication risks and diminished health-related quality of life. Resilience was associated with better postoperative outcomes, enhanced recovery, reduced complications, and improved psychological well-being through adaptive coping mechanisms.

Our findings align with previous research, indicating consensus on the influential role of preoperative psychological factors on postoperative recovery. Other reviews by Grimmett et al. (2022) and Nadina et al. (2022) corroborate our results, highlighting the significant impact of preoperative depression and anxiety on postoperative pain, functional disability, and engagement in rehabilitation. Similarly, previous research underscores the importance of personality-related factors, such as self-efficacy and optimism, in predicting positive surgical outcomes (Young, 2023). Research on resilience consistently demonstrates its positive association with better postoperative outcomes, further emphasizing its role in promoting adaptive coping mechanisms and overall psychological well-being (Molenaar et al., 2019).

Theoretical Implications

This systematic review enhances our theoretical understanding of how preoperative

psychological factors affect postoperative recovery, paving the way for future research. By synthesizing existing data, our study provides a comprehensive overview of how psychological factors such as depression, anxiety, personality-related factors, and resilience influence surgical outcomes, adding depth to the theoretical framework of prehabilitation.

Our study expands on existing literature by addressing personality-related factors and resilience, which have not been as frequently acknowledged as targets for preoperative psychological support compared to depression and anxiety (Durrand et al., 2019). We suggest integrating psychological interventions into multimodal preoperative optimization strategies. By incorporating psychological interventions alongside traditional approaches like exercise and nutrition, such multimodal strategies have the potential to enhance patient outcomes and overall surgical experience (Hirst et al., 2024). Furthermore, our research emphasizes the importance of personalized psychological interventions tailored to individual patient needs. This aligns with broader literature emphasizing the value of patient-centered care and empowerment in healthcare settings (Driessens et al., 2024). Previous studies have shown promising results for techniques like cognitive-behavioral therapy, relaxation techniques, and mindfulness-based interventions (Lobo et al., 2022; Nadina et al., 2022). Our study contributes valuable theoretical insights relevant for further development of comprehensive preoperative psychological interventions.

Clinical Implications

The findings of this systematic review have significant clinical implications for patients and practitioners. Addressing preoperative psychological factors like depression, anxiety, personality-related factors, and resilience within prehabilitation interventions can potentially enhance patient satisfaction, well-being, and recovery outcomes, thereby optimizing the surgical experience. Previous research advocates for integrating prehabilitation into routine practice, emphasizing its role in enhancing the quality of care, reducing costs, and

improving satisfaction for both patients and healthcare professionals (Molenaar et al., 2023). Our study highlights the necessity of patient engagement in prehabilitation, aligning with Schierbeck (2022), who stresses the pivotal role of patients in improving their health outcomes during the preoperative period. Integrating patient-centered prehabilitation programs into clinical practice could enhance patient empowerment and contribute to better preoperative care (Schierbeck, 2022).

Insights from Nadina et al. (2022) underscore the clinical significance of preoperative psychological interventions in reducing postoperative pain and disability. Incorporating these interventions into prehabilitation programs is crucial for optimizing patient outcomes. Screening for preoperative depression and anxiety allows for early identification of at-risk patients, facilitating tailored interventions and potentially improving postoperative recovery trajectories (Young, 2023). Screening tools like the Hospital Anxiety and Depression Scale (HADS) are valuable for identifying patients who may benefit from psychological interventions (Durrand et al., 2019), though the development of more comprehensive screening tools is recommended for future research.

Influential positive and adverse traits related to personality have been highlighted in previous studies (Durrand et al., 2019), in line with our findings. Therefore, clinicians should consider assessing patients' personality traits, such as self-efficacy, motivation, ego strength, and coping skills, as part of routine preoperative assessments. By identifying patients with low self-efficacy or inadequate coping skills, clinicians can tailor interventions to boost psychological resources and resilience before surgery. Identifying personality traits such as neuroticism and conscientiousness as predictors of postoperative outcomes emphasizes the need for personalized interventions. For patients with high neuroticism, reducing anxiety and enhancing coping strategies can mitigate complications and improve recovery. Conversely, those with high conscientiousness benefit from bolstered self-efficacy and motivation to engage in rehabilitation. Personalized preoperative evaluations and interventions can optimize

patient outcomes and enhance the effectiveness of postoperative care.

Incorporating resilience-building interventions into preoperative care programs is essential for enhancing patients' adaptive coping skills and psychological well-being. Previous research suggests that prehabilitation should aim to strengthen patients' resilience to withstand any pre- and postoperative comorbidities (Sliwinski et al., 2023). Thus, preoperative assessments should evaluate baseline resilience to identify patients at higher risk of poor postoperative outcomes. Recognizing lower resilience allows clinicians to implement targeted interventions that enhance psychological flexibility and coping strategies before surgery. Reflecting on the current study's findings, incorporating resilience-focused interventions into prehabilitation programs likely empowers patients to manage surgical stress, optimize recovery, improve pain management, shorten hospital stays, and enhance overall well-being and quality of life, ultimately improving patient outcomes and satisfaction.

Study Limitations

While this systematic review provides valuable insights into the psychological factors related to postoperative recovery, some limitations should be acknowledged. Firstly, this study establishes relational associations between psychological factors and postoperative outcomes, but the findings do not infer causality. Moreover, the study selection process was conducted by a single individual, which may introduce subjectivity or bias, potentially affecting the inclusivity of the findings. Another limitation is the inclusion of multiple types of studies, including primary research articles and other literature reviews. While this approach was intended to provide a comprehensive overview of the available evidence, it introduced the possibility of overlap in the cited sources. Specifically, some literature reviews included in this study may have referenced primary studies that were also independently included in our analysis. Furthermore, the absence of a formal quality assessment of the included studies could impact the reliability and validity of the synthesized evidence. The generalizability of

the findings may be limited to the selected studies and their respective populations, warranting caution in extrapolating the results to broader clinical contexts.

Despite these limitations, the study contributes valuable insights to the field of prehabilitation and postoperative recovery. A significant strength of this study is its thorough identification and synthesis of the available evidence regarding a broad range of psychological factors. Our study provides a comprehensive overview that highlights key findings and trends in the literature, thereby offering valuable insights for future research directions that can address the aforementioned methodological limitations.

Future Research Recommendations

The consistent associations observed between preoperative psychological factors and postoperative outcomes highlight the need for further research. Considering the present study's limitations, future reviews should involve multiple reviewers to ensure a more objective and comprehensive study selection process. Additionally, implementing a standardized quality assessment tool would enhance the robustness of findings. Given the current study's lack of causality inference, future research should employ longitudinal studies or randomized controlled trials to explore causal relationships between preoperative psychological factors and postoperative outcomes more comprehensively. Longitudinal studies can track changes in psychological variables and surgical outcomes over time, providing insights into the temporal dynamics of recovery processes. Moreover, multimodal approaches, combining quantitative assessments with qualitative interviews, offer a comprehensive understanding of the psychological determinants of surgical outcomes. Multimodal prehabilitation has been demonstrated to significantly reduce postoperative complications and enhance recovery (Molenaar et al., 2023).

The present study lays the groundwork for integrating psychological factors into prehabilitation programs. Current preoperative interventions mostly focus on anxiety and

depression, such as by using the Hospital Anxiety and Depression Scale for screening (Durrand et al., 2019). Previous research by Marinelli et al. (2020) demonstrated the feasibility and effectiveness of psychologist-led interventions in reducing preoperative anxiety and postoperative pain perception among patients undergoing major pancreatic cancer surgery. Their study utilized a one-session psychological intervention focusing on increasing patients' self-efficacy in managing anxiety, resulting in reduced emotional distress and improved emotional well-being postoperatively (Marinelli et al., 2020).

The present study highlights the need to expand beyond traditional approaches and explore the efficacy of developing more comprehensive psychological interventions. Future research should focus on integrating a broader range of psychological factors, including depression, anxiety, personality traits, and resilience, into prehabilitation programs. Investigating resilience-focused interventions to enhance patients' adaptive coping strategies and optimize postoperative well-being and recovery trajectories is warranted. Due to a minimal number of articles related to personality traits, there remains a gap of knowledge on the relation between various personality factors and postoperative outcomes, suggesting a need for further exploration in future research endeavors. If future research consistently associates personality factors with postoperative outcomes, considering their integration into prehabilitation programs may be warranted to optimize patient care pathways and enhance overall surgical outcomes. Overall, our study underscores the importance of future research endeavors aimed at developing comprehensive psychological interventions tailored to individual patient needs.

Conclusion

This study aimed to explore the role of preoperative psychological factors in postoperative recovery following major elective surgical procedures in adult patients. Through a comprehensive systematic review, four key preoperative psychological factors were identified: depression, anxiety, personality-related factors, and resilience. The findings underscore the significant impact of these psychological factors on various aspects of postoperative recovery, including pain, functional recovery, surgical complications, long-term recovery, quality of life, and overall psychological well-being. Recognizing the crucial role of preoperative psychological factors, addressing these aspects within prehabilitation programs and personalized patient care plans becomes imperative. A multimodal approach that empowers patients through active participation in psychological interventions alongside medical and surgical management is essential for optimizing postoperative recovery trajectories and enhancing patient outcomes and postoperative quality of life. Given the significant impact of these psychological factors, further research is needed to establish causal relationships between preoperative psychological factors and postoperative outcomes. Additionally, there is a need to develop tailored interventions aimed at improving patient well-being throughout the surgical journey.

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Appendix A

Search Query

‘’Surgery’’ OR ‘’Surgical Procedures’’ OR ‘’Surgical Procedure’’ OR ‘’Surgical Treatment’’ OR ‘’Operation’’ OR ‘’Major Surgery’’ OR ‘’Operative Surgical Procedure’’ OR ‘’Invasive Procedures’’ OR ‘’Operative Procedures’’ OR ‘’Operative Procedure’’ OR ‘’Operative Treatment’’ AND ‘’Surgical Outcomes’’ OR ‘’Surgical Results’’ OR ‘’Surgical Recovery’’ OR ‘’Impact of Surgery’’ OR ‘’Surgical Rehabilitation’’ OR ‘’Post-operative’’ OR ‘’Post-surgery’’ OR ‘’Post-operative outcomes’’ OR ‘’Post-operative results’’ OR ‘’Post-operative recovery’’ OR ‘’Impact of Operation’’ OR ‘’Quality of Life’’ OR ‘’Well-being’’ OR ‘’Recovery’’ OR ‘’Implications’’ OR ‘’Impact’’ OR ‘’Effect’’ OR ‘’Post-operative Rehabilitation’’ OR ‘’Return to Work’’ OR ‘’Recovery of Function’’ OR ‘’Recovery of Activities’’ OR ‘’Recovery in Daily Life’’ AND ‘’Psychological Factors’’ OR ‘’Psychological Effects’’ OR ‘’Psychological Causes’’ OR ‘’Psychological Influences’’ OR ‘’Psychological Constructs’’ OR ‘’Psychological Determinants’’ OR ‘’Psychological Health’’ OR ‘’Psychosocial Factors’’ OR ‘’Psychological Predisposing Factors’’ OR ‘’Psychological Risk Factors’’ OR ‘’Psychological Protective Factors’’ OR ‘’Psychological Resilience’’ OR ‘’Psychological Assessment’’ OR ‘’Psychological Testing’’ OR ‘’Psychological Buffer’’ OR ‘’Mental Risk Factors’’ OR ‘’Mental Factors’’ OR ‘’Mental Effects’’ OR ‘’Mental Causes’’ OR ‘’Mental Influences’’ OR ‘’Mental Constructs’’ OR ‘’Mental Determinants’’ OR ‘’Mental Health’’ OR ‘’Mental Predisposing Factors’’ OR ‘’Mental Protective Factors’’ OR ‘’Mental Buffer’’ OR ‘’Mental Resilience’’ OR ‘’Contributing Psychological Factors’’ OR ‘’Contributing Mental Factors’’ OR ‘’Cause of Psychological Vulnerability’’ OR ‘’Cause of Mental Vulnerability’’ OR ‘’Promotive Psychological Factors’’ OR ‘’Promotive Mental Factors’’ OR ‘’Self-efficacy’’ (Title and/or Abstract)

Appendix B

Data Extraction Table

Author(s), Year of Publication	Study Design	Population	Key Psychological Factor	Postoperative Outcome(s)	Relevant/Significant Findings on Psychological Factors and Postoperative Recovery
Mijderwijk et al., 2018	RCT	*n* = 398 patients	Depression	Quality of Life	Mean depression scores (HADS-D) remained about the same over time after surgery. Baseline depression scores (HADS-D) were important predictors for depression after surgery. The prognostic model for depression after surgery included baseline HADS-D as a significant predictor (B = 0.36). Depression (HADS-D) had a substantial prognostic effect (B = 0.36) on psychological outcomes after surgery.
Levett and Grimmett, 2019	Review	*n* = Unknown	Depression	Pain; Surgical Complications & Recovery	Preoperative depression is evaluated in studies addressing surgical outcomes. Depression is associated with unfavorable short-term surgical outcomes. Depression is associated with long-term pain following surgery. Preoperative depression predicts chronic postsurgical pain. Psychological interventions targeting depression may improve postoperative outcomes. Baseline evaluation of depression is important for identifying patients who may benefit from prehabilitation.

Khatib et al., 2015	Systematic Review	*n* = 19 studies	Depression	Pain; Functional Recovery; Quality of Life	Preoperative depression is a significant predictor of postoperative outcomes in total knee arthroplasty (TKA), including persistent pain and reduced level of function. Depression influences knee function scores at 5 years postoperatively, contributing to approximately a 10% difference compared to patients without depression. Patients with depression may show improvement in overall knee scores but not in function compared to those without depression. Depression is associated with elevated pain scores persisting for up to 2 years after surgery. Outcome measures affected by depression include persistent pain, functional recovery, patient satisfaction, and quality of life.
Lee et al., 2018	Longitudinal Prospective Study	*n* = 336 patients	Depression	Quality of Life	Patients with depressive symptoms experienced a substantial decrement in QoL postoperatively compared to those without depressive symptoms, affecting physical, mental, and social well-being. Depressive symptoms had long-term impacts on QoL. Depressive symptoms were significantly associated with postoperative emotional and social impairment.
Ditton et al., 2020	Review	*n* = Unknown	Depression	Pain; Functional Recovery; Quality of Life; Surgical Complications & Recovery	Depression is associated with adverse postoperative TKA outcomes, including: worse knee stiffness and disability, poorer functional recovery, higher pain severity, increased risk of chronic pain, smaller improvements in pain, longer postoperative hospital stay, poorer motivation and adherence to rehabilitation intervention, poorer expectations of rehabilitation outcomes, poorer quality of life, higher 1-year mortality rates (elderly patients).
Panatonni et al., 2022	Systematic Review	*n* = 15 articles	Depression	Pain; Functional Recovery	Depression is consistently associated with worse patient-reported outcomes, including function, disability, and pain intensity, both preoperatively and postoperatively. Preoperative depression significantly impacts patient-reported outcomes after rotator cuff surgery.

Abraham et al., 2020	Qualitative Study	*n* = 40 interviews	Depression	Pain; Functional Recovery; Quality of Life; Surgical Complications & Recovery	Preoperative depression can lead to increased pain perception and reduced pain tolerance postoperatively, impacting recovery and functional outcomes. Poor management of depression can contribute to longer hospital stays, increased risk of complications, and decreased quality of life during recovery. Untreated preoperative depression may interfere with patients' ability to engage in rehabilitation programs, leading to slower recovery and reduced functional capacity.
Gorini et al., 2022	Empirical Study	*n* = 151 patients	Depression	Quality of Life; Surgical Complications & Recovery	Symptoms of depression did not show a significant effect on the length of hospital stay. Preoperative symptoms of depression negatively predict perceived Health-Related Quality of Life (HRQoL) 3 months after surgery.
Pan et al., 2019	Retrospective Observational Design	*n* = 7,153,750 patients	Depression	Pain; Surgical Complications & Recovery	Contrary to expectations, patients without depression or anxiety had the longest hospital stay, followed by the depression group, the anxiety group, and then the depression-anxiety group. Patients with depression had higher odds ratios for major complications such as acute renal failure, anemia, myocardial infarction, pulmonary embolism, pneumonia, and stroke but lower odds ratios for cardiac and central nervous complications compared to those without depression or anxiety. Patients with depression showed significantly higher incidences of pain-related symptoms compared to those without depression or anxiety, including chronic pain syndrome, acute and chronic postoperative pain, limb pain, and chest pain. The depression-anxiety group exhibited the higher odds ratios for pain disorders related to psychological factors.
Suffeda et al., 2016	Prospective Single Center Cohort Observational Study	*n* = 28 patients	Depression	Pain	Depression was positively correlated with pain catastrophizing and state operation anxiety, indicating a significant relationship between depression and preoperative psychological parameters. Higher depression scores were associated with more severe postoperative pain, suggesting that depression is a significant predictor of increased pain after surgery.

Lafage et al., 2021	Retrospective Review of Prospective Multicenter Database	*n* = 513 patients	Depression	Functional Recovery	The study found a significant association between preoperative mental status, particularly depression, and disability in patients undergoing surgery for adult spinal deformity. Patients with low mental scores exhibited higher disability levels. Both low and high mental score groups showed significant improvement in patient-reported outcomes after surgery, but the high mental score group demonstrated a more significant improvement in health-related quality of life (HRQOL) at the 2-year follow-up. Patients with higher preoperative mental scores reported greater satisfaction with surgery outcomes at the 2-year follow-up compared to those with lower preoperative mental scores.
Zhou et al., 2021	Retrospective Cohort Study	*n* = 125 patients	Depression	Pain; Functional Recovery	Depressed patients tended to be older (mean age 55.6 years) compared to non-depressed patients (mean age 49.8 years). They also had longer hospital stays and higher rates of complications, diabetes, and hypertension. Patients with depressive symptoms had higher preoperative disability (ODI), higher pain scores (VAS), and longer symptom duration compared to non-depressed patients. Depressed patients demonstrated worse postoperative outcomes across various measures including ODI, VAS for back and leg pain, and lower recovery ratios (RR). Both BDI and HAMD-24 scores were strong predictors of worse postoperative outcomes, suggesting their utility in preoperative depression screening. Higher BDI and HAMD-24 scores were associated with smaller improvements in disability and pain scores postoperatively.
Theologis et al., 2016	Multicenter Study	*n* = 267 patients	Depression	Pain; Functional Recovery; Quality of Life	Significant improvements observed in all spinal deformity radiographic parameters and HRQOL scores for the entire cohort. Depressed and nondepressed patients showed similar absolute improvements in HRQOL scores postoperatively. After adjusting for differences, depressed patients did not significantly differ from nondepressed patients regarding 2-year outcome measures. Depression significantly influenced pre- and postoperative functional disability and pain. Depressed patients showed greater functional disability and worse pain compared to nondepressed

					patients.
Scantling-Birch et al., 2021	Prospective Multi-Centre Observational Study	*n* = 46 patients	Depression	Surgical Complications & Recovery	There is a potential link between preoperative depression and short-term postoperative outcomes, particularly in terms of critical care stay and opioid duration. Higher depression scores correlated moderately with longer total critical care stay and greater duration of opioid use postoperatively.
Alattas et al., 2017	Review	*n* = 10 studies	Depression	Pain; Functional Recovery; Quality of Life	Higher levels of preoperative depression may predict greater severity of pain and stiffness, as well as poorer function, after total knee arthroplasty (TKA). Preoperative depression, assessed using various scales including the Hospital Anxiety and Depression (HADS) score, correlates with higher levels of knee disability and reduced pain relief after surgery. Studies consistently show a correlation between pre-operative depression and poorer post-operative pain management and functional outcomes, except for one study where depression did not predict poorer outcomes.
Tolk et al., 2019	Cross-Sectional Study	*n* = 204 patients	Depression	Surgical Complications & Recovery	Patients with a HADS depression score < 8 predict higher postoperative knee replacement expectation scores. Higher levels of depressive symptoms are associated with lower expectations for treatment outcomes. Lower expectations in patients with depressive symptoms may contribute to poorer postoperative outcomes, potentially due to decreased motivation or engagement with rehabilitation.
Coronado et al., 2018	Systematic Review	*n* = 10 studies	Depression	Pain; Functional Recovery	Scores indicating poorer emotional or mental health, including depression, were consistently associated with worse psychosocial and physical functioning before surgery. Depression was moderately correlated with pain and disability, suggesting its importance as a determinant of emotional functioning and patient-reported outcomes. However, depression was not associated with postoperative function or disability and pain in multiple prospective studies.

Mijderwijk et al., 2018	RCT	*n* = 398 patients	Anxiety	Quality of Life	Mean anxiety scores (STAI-State, STAI-Trait, and HADS-A) decreased after surgery. Baseline anxiety scores (HADS-A) were important predictors for anxiety after surgery. The prognostic model for anxiety after surgery included baseline HADS-A as a significant predictor (B = 0.41). Anxiety (HADS-A) had a substantial prognostic effect (B = 0.41) on psychological outcomes after surgery.
Levett and Grimmett, 2019	Review	*n* = Unknown	Anxiety	Pain; Surgical Complications & Length of Hospital Stay; Quality of Life	Preoperative anxiety, psychological stress, and perceived stress are evaluated in studies addressing surgical outcomes. Trait anxiety, state anxiety, and psychological distress are associated with unfavorable short-term surgical outcomes. Anxiety predicts short-term operative outcomes and length of hospital stay. Preoperative anxiety doubles the risk of chronic postsurgical pain.
Ditton et al., 2020	Review	*n* = Unknown	Anxiety	Pain; Functional Recovery & Long-Term Surgical Outcomes	Anxiety is associated with adverse postoperative TKA outcomes, including: worse knee disability, poorer functional recovery and physical functioning, higher severity of postoperative pain (immediately following surgery), higher pain severity, increased risk of chronic pain, increased likelihood of avoidance behaviors, and some evidence of longer-term impact (up to 10 years), while other evidence suggests effects diminish after 1 year.
Panatonni et al., 2022	Systematic Review	*n* = 15 articles	Anxiety	Pain; Functional Recovery	Anxiety is a significant psychosocial factor associated with poorer function, disability, and pain intensity before and after rotator cuff surgery. Preoperative anxiety may increase rumination, alter pain perception, and decrease satisfaction post-surgery.
Abraham et al., 2020	Qualitative Study	*n* = 40 interviews	Anxiety	Pain; Surgical Complications & Length of Hospital Stay; Quality of Life; Functional Recovery	Anxiety and stress are experienced by older adults prior to surgery due to significant pain, lack of sleep, fear, and uncertainty about the surgery process. Preoperative anxiety can heighten pain perception and diminish pain tolerance postoperatively, affecting recovery and functional outcomes. Poor management of anxiety may prolong hospital stays, increase the risk of complications, and decrease the quality of life during recovery. Untreated anxiety may impede patients' participation in rehabilitation programs, leading to slower recovery and decreased functional capacity.

Gorini et al., 2022	Empirical Study	*n* = 151 patients	Anxiety	Length of Hospital Stay; Quality of Life	Symptoms of anxiety significantly impact the duration of hospitalization after cardiac surgery. Presurgery symptoms of anxiety are associated with poorer HRQoL after 3 months from surgery.
Pan et al., 2019	Retrospective Observational Design	*n* = 7,153,750 patients	Anxiety	Pain; Surgical Complications & Length of Hospital Stay	Contrary to expectations, patients without depression or anxiety had the longest hospital stay, followed by the depression group, the anxiety group, and then the depression-anxiety group. Patients with anxiety or both depression and anxiety also exhibited higher odds ratios for various complications, including anemia, myocardial infarction, pneumonia, and stroke. Patients with anxiety showed significantly higher incidences of pain-related symptoms compared to those without depression or anxiety, including chronic pain syndrome, acute and chronic postoperative pain, limb pain, and chest pain. The depression-anxiety group exhibited the higher odds ratios for pain disorders related to psychological factors.

Reyes-Gilabert et al., 2017	Prospective and Descriptive Clinical Study	*n* = 45	Anxiety	Pain; Surgical Complications; Quality of Life; Functional Recovery	Anxiety can heighten sensitivity to pain, making patients perceive pain more intensely both before and after surgery. High levels of anxiety can impair the body's natural healing processes, potentially leading to delayed recovery and prolonged postoperative discomfort. Anxiety may interfere with patients' ability to follow preoperative instructions or adhere to postoperative care routines, increasing the risk of complications and compromising surgical outcomes. Anxiety can cause significant emotional distress, including feelings of fear, worry, and agitation, which may persist during the recovery period and impact overall well-being. Persistent anxiety before and after surgery can diminish patients' quality of life by affecting their ability to engage in daily activities, social interactions, and work responsibilities. Excessive preoperative anxiety can lead to a negative surgical experience, potentially contributing to heightened stress levels, dissatisfaction with care, and reluctance to undergo future medical procedures. Postoperative anxiety may exacerbate symptoms such as nausea, vomiting, and insomnia, increasing the likelihood of complications and prolonging recovery time. Results of the study included a statistically significant association between post- and preoperative anxiety ($r=0.56$, $p<0.001$) and a correlation between pain score and postoperative anxiety (Rho= -0.35, $p=0.02$). The likelihood of postoperative anxiety was related to preoperative anxiety (OR=1.3, $p=0.03$).
Coronado et al., 2018	Systematic Review	*n* = 10 studies	Anxiety	Pain; Functional Recovery	Preoperative concerns and anxiety were consistently associated with poorer psychosocial and physical functioning before surgery. Anxiety showed consistent associations with function or disability and pain before surgical intervention. However, anxiety was not associated with postoperative function or disability and pain in multiple prospective studies.
Suffeda et al., 2016	Prospective Single Center Cohort Observational Study	*n* = 28 patients	Anxiety	Pain	Anxiety was positively correlated with depression and pain catastrophizing, indicating an association between anxiety and other preoperative psychological factors. Higher trait anxiety scores were

					associated with more severe postoperative pain.
Aylward et al., 2022	Cross-Sectional Quantitative Study	*n* = 196 patients	Anxiety	Long-Term Surgical Outcomes	Participants with severe anxiety initially lost the most weight but also experienced the most significant weight regain by 30 months post-surgery. Anxiety diagnoses, including generalized anxiety disorder and social anxiety disorder, were extracted from medical records and predicted weight loss outcomes. Post-hoc analyses revealed a trajectory wherein those with minimal anxiety initially lost weight but maintained weight loss over time, while those with higher anxiety initially lost more weight but experienced weight regain in the longer term.
Babińska et al., 2017	Multicenter Comparative Study	*n* = 32 patients	Anxiety	Quality of Life	There was a significant negative correlation between preoperative anxiety (A-State) and satisfaction with the surgery, indicating that lower anxiety levels before surgery were associated with higher satisfaction afterward. Lower anxiety levels before surgery were also correlated with higher levels of trust in the doctor and satisfaction with the treatment method. The planned use of IONM (Intraoperative Neuromonitoring) during thyroidectomy may reduce patients' anxiety before the surgery. The lower the patient's anxiety level (as a temporary condition just before the surgery), the higher "the satisfaction from the undergone operation", and "the easiness of speaking" measured after the surgery.
Roh et al., 2014	Cohort Study	*n* = 121 patients	Anxiety	Functional Recovery	Pain coping strategies, as measured by Pain Catastrophizing Scale (PCS) and Pain Anxiety Symptom Scale (PASS) scores, were associated with grip strength, wrist range of motion (ROM), and Michigan Hand Outcomes Questionnaire (MHQ) scores up to 24 weeks post-surgery. A significant decrease in grip strength was observed in patients with increasing patient age, PCS score, PASS score, or severe fracture type at various intervals. Preoperative anxiety may hinder the recovery of wrist mobility and physical recovery following surgery. Higher levels of preoperative anxiety were linked to poorer self-reported outcomes related to hand function and overall hand health.

Scantling-Birch et al., 2021	Prospective Multi-Centre Observational Study	*n* = 46 patients	Anxiety	Length of Hospital Stay	Preoperative state anxiety showed a moderate positive correlation with total critical care stay. Higher state anxiety scores were associated with longer total critical care stay postoperatively.
Alattas et al., 2017	Review	*n* = 10 studies	Anxiety	Pain; Quality of Life; Functional Recovery	Preoperative anxiety, assessed using scales like the Hospital Anxiety and Depression (HADS) score and State Trait Anxiety Inventory (STAI), is associated with poorer outcomes after TKA, including higher levels of knee disability, pain, and functional limitations. Higher preoperative anxiety levels predict worse quality of life (QoL) outcomes at 1 year post-surgery. Studies show a consistent correlation between preoperative anxiety and increased postoperative pain severity and functional limitations, although some variations exist in the predictive power of anxiety across different outcome measures.
Beisland et al., 2020	Prospective Observational Study	*n* = 153 patients	Anxiety	Quality of Life	Preoperative anxiety levels were closely associated with distress and health-related quality of life (HRQoL) in patients scheduled for nephrectomy, indicating a negative impact on their overall well-being. Younger age, female gender, and lower education level were correlated with higher level of preoperative distress.
Tolk et al., 2019	Cross-Sectional Study	*n* = 204 patients	Anxiety	Functional Recovery & Long-Term Surgical Outcomes	No significant relationship found between preoperative anxiety scores, as measured by the HADS anxiety score, and postoperative knee replacement expectation scores. Anxiety scores alone did not predict expectations for treatment outcomes, suggesting that preoperative anxiety may not directly influence postoperative expectations. While anxiety reduction is important for overall patient well-being, it may not be a primary driver of postoperative expectations or outcomes in knee replacement surgery.

Levett and Grimmett, 2019	Review	*n* = Unknown	Personality-Related Factors	Surgical Recovery & Postoperative Complications	Pre-operative personality traits evaluated in studies addressing surgical outcomes include neuroticism, extraversion, self-esteem, motivation, ego strength, and inadequacy. Self-efficacy is associated with favorable short-term surgical outcomes. Personality traits like neuroticism and extraversion are not strong predictors of short-term physical outcomes. Self-efficacy, a positive outlook, and patient-perceived control are associated with earlier functional recovery. Inadequate coping skills and low self-esteem may negatively impact surgical outcomes. High levels of motivation and ego strength may contribute to better postoperative recovery. Patients with external locus of control and anger control may have more favorable surgical outcomes.
Shin et al., 2016	Prospective Longitudinal Study	*n* = 78 patients	Personality-Related Factors	Surgical Recovery & Postoperative Complications	Lower MMSE score, regional anesthesia, higher neuroticism, and lower conscientiousness are significant factors in the final model associated with postoperative delirium. Patients with delirium had a longer postoperative stay compared to those without delirium. Neuroticism and conscientiousness were identified as risk factors for postoperative delirium. The influence of these personality traits was increased under regional anesthesia. Neuroticism and conscientiousness remained significant predictors of delirium regardless of gender. Preoperative anxiety and depression scores were not predictive of postoperative delirium.
Marek et al., 2013	Retrospective Analysis	*n* = 1,025 patients	Personality-Related Factors	Surgical Recovery & Postoperative Complications	Certain personality traits, as measured by the MMPI-2-RF, were prevalent among bariatric surgery candidates. These traits included tendencies towards behavioral dysfunction, conduct problems, and concerns about health and energy levels. Preoperative personality traits, as measured by the MMPI-2-RF, may have implications for post-surgical outcomes. For instance, candidates with elevated scores on internalizing scales might be at increased risk for mood disturbances and maladaptive eating behaviors post-surgery. Similarly, candidates with externalizing traits might face challenges related to substance use and behavioral dysregulation in the postoperative period.

Brown et al., 2014	Randomized Controlled Trial	*n* = 31 patients	Personality-Related Factors	Patient Engagement in Rehabilitation	Trends suggest that preoperative exercise may maintain or improve self-efficacy expectations post-surgery, although statistical significance was not reached. Improving these perceptions could increase patient engagement in rehabilitation and long-term exercise adherence. The influence of self-efficacy on postoperative outcomes is inconclusive.
Gonella et al., 2021	Longitudinal Prospective Clinical Trial	*n* = 80 patients	Personality-Related Factors	Patient Engagement in Rehabilitation	Patients showed a significant increase in their perceived knowledge about the surgical procedure and self-efficacy in performing postoperative techniques after the intervention. Increased patient self-efficacy in postoperative activities. However, nurses scored patients' knowledge and self-efficacy significantly lower than patients themselves, indicating a discrepancy in perception between patients and healthcare professionals.
Tolk et al., 2019	Cross-Sectional Study	*n* = 204 patients	Personality-Related Factors	Surgical Recovery & Postoperative Complications	Optimism, as measured by the LOT-R optimism subscale, did not significantly predict postoperative knee replacement expectation scores. Other personality traits, such as rumination, magnification, and helplessness, also did not significantly predict expectations for treatment outcomes. Psychological factors beyond depression and anxiety, as measured by these personality traits, may not independently influence expectations for postoperative outcomes in knee replacement surgery.
Beisland et al., 2020	Prospective Observational Study	*n* = 153 patients	Personality-Related Factors	Quality of Life	Neuroticism level was the most consistent predictor of health-related quality of life (HRQoL) and distress in patients awaiting nephrectomy. Higher levels of neuroticism were uniquely associated with poorer HRQoL and higher distress levels. Avoidant coping strategies were also associated with higher levels of distress, indicating that individual coping mechanisms can impact postoperative outcomes.

Coronado et al., 2018	Systematic Review	*n* = 10 studies	Resilience	Protection Against Surgical Stressors	Patient expectations before surgery were significantly associated with postoperative outcomes, suggesting the importance of preoperative procedures to assess and align patient expectations. Positive psychosocial functioning, like self-efficacy and resilience, may facilitate beneficial responses after surgery by protecting against negative psychosocial influences.
Nwankwo et al., 2021	Cohort Study	*n* = 117 patients	Resilience	Functional Recovery; Protection Against Surgical Stressors	Preoperative resilience was positively correlated with knee function, general physical health, and mental health prior to TKA. Simple linear regression and adjusted multiple variable regression models showed a significant association between preoperative resilience and 3-month knee function and general physical health. The association between resilience and postoperative outcomes persisted even after adjusting for pain catastrophizing and other covariates. Patients with higher levels of resilience were likely to handle surgery-related stressors better than those with negative perceptions.
Beeckman et al., 2021	Prospective Longitudinal Study	*n* = 100 patients	Resilience	Pain; Functional Recovery; Quality of Life	Psychological flexibility (resilience) before surgery and acceptance of postsurgical pain predicted more favorable recovery in HRQoL and pain outcomes but did not predict recovery in physical activity. The findings suggest the importance of assessing presurgical psychological factors to target interventions effectively and promote adaptive recovery.
Shan et al., 2023	Prospective Cohort Study	*n* = 198 patients	Resilience	Functional Recovery; Psychological Well-Being	Total mean psychological resilience scores for the entire sample were relatively low across peri-operational stages. Optimism dimension scores were extremely low, indicating a need to enhance optimism among TKA patients. Hope and self-efficacy were strong predictors of better resilience trajectories, with hope influencing appraisal and coping strategies. The majority of TKA patients reported low psychological resilience levels pre- and postoperatively. Surgery was the major stressor influencing patients' psychological resilience. Interventions aimed at improving patients' psychological resilience are important for several reasons, including enhanced recovery, reduced complications, improved mental health,

					patient empowerment, and long-term adaptation.
Chen et al., 2020	Descriptive Cross-Sectional Study	*n* = 382 patients	Resilience	Functional Recovery; Quality of Life; Psychological Well-Being & Coping Strategies	The total psychological resilience score of postoperative NSCLC patients was relatively low, with specific dimensions including toughness, strength, and optimism. Psychological resilience showed significant positive correlations with self-efficacy, confrontation, avoidance, and social support, and a significant negative correlation with acceptance-resignation. Psychological resilience was found to be lower in older patients and those with chronic illnesses but higher in patients with better living environments, higher education levels, and higher average incomes. Interventions targeting factors such as social support, self-efficacy, and coping strategies could potentially improve psychological resilience and in turn enhance patient recovery and quality of life. The low psychological resilience among postoperative NSCLC patients could impact various aspects of their postoperative outcomes, including quality of life, treatment adherence, psychological well-being, and coping strategies.
Suffeda et al., 2016	Prospective Single Center Cohort Observational Study	*n* = 28 patients	Resilience	Pain; Protection Against Surgical Stressors	Resilience was measured using the RS-13 questionnaire, with a median score of 65. Resilience showed a negative correlation with depression and state operation anxiety, suggesting that higher resilience was associated with lower levels of depression and anxiety. While resilience was not directly associated with postoperative pain in the multivariate analysis, it played a role in mitigating the impact of depression and anxiety on pain perception, indicating its potential protective effect against psychological distress influencing pain outcomes.

Ditton et al., 2020	Review	*n* = Unknown	Resilience	Functional Recovery; Pain; Psychological Well-Being & Coping Strategies	Resilience involves utilizing cognitive, emotional, and behavioral resources to effectively cope with adversity and maintain quality of life during stressful circumstances. Resilient individuals demonstrate the ability to bounce back from stress, self-efficacy, effective engagement with social support, perseverance, and optimism. Resilience has demonstrated to be a protective factors for various health and wellbeing-related outcomes, including: better post-orthopedic surgery patient- and surgeon-rated satisfaction, higher post-rehabilitation functional independence, buffers impact of pain intensity on functional disability, buffers maladaptive cognitive and emotional responses to pain, lower levels of pain-related disability, lower 10-year morbidity rates, better mental health-related quality of life, fewer anxiety and depressive symptoms, lower rates of pain catastrophizing, less pain-related fear. Interventions aimed at enhancing resilience skills may facilitate quality of life restoration and reduction of functional disability, even in cases where pain reduction is not possible.
Janssen et al., 2019	Single-Center Controlled Before-and-After Study	*n* = Unknown	Resilience	Functional Recovery; Protection Against Surgical Stressors	Frailty increases with age, affecting physical resilience and making coping with surgical stressors challenging. Frail patients have a four-fold greater risk of major postoperative complications, longer hospital stays, and higher readmission rates. Delirium is a common postoperative complication in frail elderly patients, with incidence rates ranging from 25% to 50% after major surgery.
Gonella et al., 2021	Longitudinal Prospective Clinical Trial	*n* = 80 patients	Resilience	Psychological Well-Being	No significant change in the proportion of patients with low, normal, or high resilience was observed before and after the intervention. Resilience did not significantly change after the combined intervention, suggesting that it may be deeply ingrained and influenced by various factors beyond the scope of the intervention. While individual factors like self-confidence and self-control promote resilience, the educational intervention did not produce changes in resilience at discharge.