

## Impact of Psychological Factors on The Physical Recovery of Patients after Total Joint Replacement

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### ABSTRACT

There have been exponential increases in total joint replacement surgeries worldwide. Despite remarkable advances, the functional recovery and outcomes of orthopedic surgery are likely to be influenced by psychological factors. Post-orthopedic surgery, mental health issues such as depression, anxiety and malaise can keep patients from recognizing reductions in pain and improvements in functioning post-surgery. Several diagnostic tools are developed to assess the relationship between psychological states and functional outcomes; *Western Ontario and Mac Master Universities Osteoarthritis Index (WOMAC)*, *Short Form-36 Health Survey (SF-36)*, *Sense of coherence scale-13 (SOC-13)*, *Questionnaire for social support (F-SozU)*. Psychological interventions are cost-effective, improve post-surgical recovery while improving the functional outcomes. This article provides a comprehensive review of the impact of various psychological factors on post-surgical recovery.

**Keywords:** Total joint replacement surgeries, Psychological factors, Post-orthopedic surgery

Osteoarthritis (OA) of the large joints is one of the leading causes of pain and disability with 2.5 million people affected globally. Patients who have failed conservative medical treatment, with the most severe symptoms of arthritis, are considered for total joint replacement surgery (TJR) as the treatment of choice. Among TJRs, Total Knee Arthroplasty (TKA) and Total Hip Arthroplasty (THA) are the two most widely practiced surgeries for arthritis all over the world. Nearly 1.2 million TJR procedures are reported annually for primary total knee arthroplasty worldwide. In this way, TJRs can be considered a surrogate marker of severe osteoarthritis.[1-2]

Knee osteoarthritis represents a four fifth proportion of the global burden of osteoarthritis. In spite of advances in surgical orthopedic techniques, approximately 20% of TKA patients do not report improvement in their pain levels, physical functioning, or quality of life (QOL). Moreover, many patients (20%-50%) continue to experience functional disability. [3] There

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is a possibility that all these factors collectively involved in the TJRs may have an impact on psychological well-being at an interindividual and intraindividual level.[4]

In this light, in recent decades, psychosocial factors have increasingly been recognized as influencing joint replacement functional outcomes. A well-documented finding is that emotional distress, such as anxiety and depression, impacts the recovery of function after arthroplasty. [4]

Physical rehabilitation medicine (PRM) emerged as a way to support patients' post-surgical recovery. The practice of PRM is firmly anchored in the basic sciences. Nevertheless, a substantial proportion of patients reported dissatisfaction postoperatively due to enduring pain, functional limitations, and diminished quality of life following TJRs. [5] This article provides a comprehensive review of the impact of various psychological factors on post-surgical recovery.

### ***Correlation between psychological factors and postsurgical recovery***

Regardless of where we live on earth, every individual is unique and unrepeatable, with their own biology and history. Likewise, the response and attitude towards major surgeries like TJRs also differ. [5]

A good psychological state is an important indicator of good health. A "healthy psychology" includes several psychological and psychosocial factors, such as life satisfaction, optimism, self-esteem, and a sense of social support. Conversely, anxiety, stress, depression, and hostility can lead to a less desirable psychological state that can adversely affect one's health. [6]

There is a field of medicine called psychoneuroimmunology which investigates pathophysiological mechanisms of influence of psychological factors on the immunologic function. Scientists in this field stated that psychological factors might affect wound healing, healing, and surgical recovery directly or indirectly. The direct paths to healing include emotions' effect on stress hormones (cortisol, adrenaline, norepinephrine). Direct pathways involve a psychosocial factor (such as the patient's psychological status) and their general physical state (such as alcohol consumption, smoking, and obesity) before surgery. [7]

Several variables influence long-term survival and recovery following surgery, apart from the psychological state before surgery; as a result, its actual significance is obscured when studying these outcomes. One should therefore examine objectively if psychological factors affect surgical recovery, i.e., preoperative and early postoperative outcomes.

### **Psychological Preparation to Surgery:**

It has been reported in a meta-analysis that psychological preparation for surgery can improve postoperative outcomes. [8] According to another review, psychosocial factors play a significant role in surgical outcomes. [9] According to Devine EC,1992, psychological interventions are cost-effective since they reduce complication rates and length of stay in hospitals and ICUs.[10]

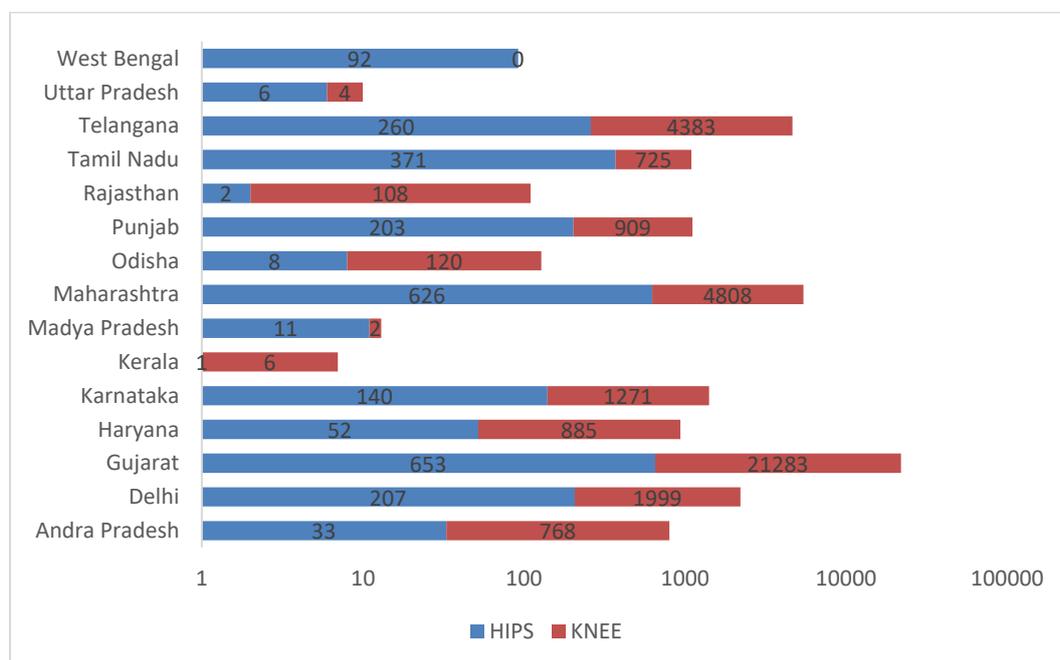
### **Joint replacement surgeries in India**

There have been exponential increases in joint replacement surgeries in India over the last few years. The government has also taken numerous initiatives for those from the lower economic strata, as well as introducing the price cap, which has led to people who had no

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access to joint replacement surgeries being operated on regularly. A market survey indicates that the number of joint replacement surgeries in India is on the rise every year, with an estimated 200,000 knee arthroplasty procedures in 2020 and 1.5 million hip arthroplasty procedures being set to grow globally in 2020–2026. [11,12]

According to statistics, many more Indians are expected to enter their 50s and 60s in the coming decade because of the bell-shaped population curve. After a decade, the total burden of joint replacement would be several times greater than it is today. [13]



**Figure 1: Distribution of Joint replacement surgeries across India (Need to reconstruct to avoid copyrights)**

### **Psychological Factors Influencing Recovery from TJRS:**

Following surgery, the patients will undergo the standard physical therapy for joint replacements: inpatient care in the hospital, outpatient home care, and therapy office care. All the measures are to drive the patient towards a speedy recovery. During this period, psychological factors may influence the recovery rate:

**Personality Type:** A person's personality characteristics influence how he or she copes with a stressful event. There are many situations that cause negative affectivity (also called neuroticism) to manifest themselves as discomfort, dissatisfaction, or distress in a person. Some people are particularly affected by stressful events and tend to have an increased likelihood of getting sick. Based on how people handle stressful situations, researchers differentiate between negative and positive personalities. Negative affectivity or neuroticism type people are associated with elevated levels of cortisol, heart rate, inflammation, and other risk factors. In contrast, positive emotional states are associated with lower stress indicators like cortisol levels and improved immune responses to challenges like surgery. [14,15] An individual's personality can be assessed by AB personality test. [16]

**Coping strategies:** These are methods people use to cope with the demands of stressful situations on both an internal and external level. There are four main types of coping strategies:[14]

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- *Avoidant coping*: Involves avoiding or withdrawing from the issue as a way of coping. According to studies, avoidant coping is effective in short-term stress situations but not long-term ones.
- *Approach coping*: Involves tackling stressful events directly and finding solutions to them. It has been proven to be very effective and is associated with better mental and physical health outcomes.
- *Problem-focused coping*: Involves attempting to overcome stressful conditions as constructively as possible.
- *Emotion-approach coping*: The essence of this process is developing clarity and focusing on emotions experienced as a result of the stressor.

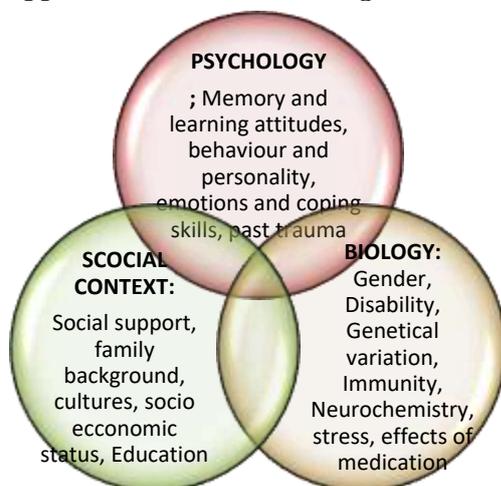
This type of coping is more beneficial (Taylor, 2011). Combining coping strategies with clinical variables has been shown to predict recovery after surgery. [17] The coping can be measured by the Ways of Coping (WOC) scale. [18]

**Social support**: Among the psychosocial aspects, social support provides the most protection against stress. It is the feeling that a person has when others tell them he or she is loved, valued, cared for, and a part of their social network. Social support decreases the likelihood of illness and speeds the recovery from illness. [19] People with high social support experience less stress when they face a stressful situation and cope more successfully. [20]

### *Screening Psychological Status:*

**Psychology models**: For diagnosing and treating people, biomedical models have traditionally been used. Psychology has recently proved that it is not the most effective model for diagnosing and treating patients, despite being widely accepted and used for many years. The biopsychosocial model is now more commonly used by psychologists (Figure 2). A more comprehensive, holistic approach to diagnosing and treating patients was developed with this model in the 1980s. This method considers physiologic or biological characteristics of the disorder, psychological factors affecting a patient, and social influences acting on a patient. [21] It allows for an accurate diagnosis and a more effective treatment plan since it considers all aspects of the patient's life. [14,21]

### *Biopsychosocial Approach to Understanding Health*



**Figure 2: Chart illustrating the various aspects involved in the biopsychosocial model for understanding health, reproduced from Taylor, 2011**

### ***Instruments Used for Screening Psychological Factors Influencing TJRS:***

Most of the researchers have used the following scales for the assessment of impact of psychological factors on recovery from TKA and THA.

- ***Western Ontario and Mac Master Universities Osteoarthritis Index (WOMAC):*** This scale used in research is used to assess disease-specific outcomes. WOMAC measures osteoarthritis-specific dimensions in patients with lower-limb osteoarthritis, a reliable, valid tool used worldwide. There are 24 items categorized into pain, stiffness, and functional limitations (function), adding up to the total score. Responses are rated on an 11-point Likert scale. The higher the value, the greater the severity of the symptoms. [22]
- ***Short Form-36 Health Survey (SF-36):*** This is a psychometrically proven questionnaire for assessing general health-related quality of life (HRQoL). The 36 items are divided into eight subscales, and a physical (PCS) and a mental (MCS) component summary score can be computed. A high value suggests a high HRQoL. [23]
- ***Sense of coherence scale-13 (SOC-13):*** The SOC-13, a short form of the SOC-29, measures the extent of the sense of coherence proclaimed by Antonovsky. A 7-point Likert scale is used to answer each of the 13 questions. The higher the value, the greater the sense of coherence. [24]
- ***Questionnaire for social support (F-SozU):*** F-SozU is used for the assessment of subjectively perceived social support. The short form consists of 22 items, which are answered on a 5-point Likert-scale. A high value suggests high social support. [25]

### ***Studies on Impact of Psychological Factors on TJRS***

Post knee replacement surgery mental health issues such as depression, anxiety and malaise can keep patients from recognizing reductions in pain and improvements in functioning post-surgery, even when their surgeries are medically successful, adds Block. Pain has psychological and medical significance. It is common for patients to express fear of pain when asked what they fear most about illness and its treatment. Anxiety over losing a limb, surgery, or even death is greater than the fear of being unable to reduce one's suffering. [26]

#### ***Depression:***

Symptoms of depression are prevalent among patients undergoing arthroplasty (10–33%). Depressive symptoms can disrupt recovery processes in several ways. A patient's ability to engage in rehabilitation activities and maintain appropriate daily physical activity levels may be affected by physical slowing and diminished motivation associated with depression. [27] TKA is associated with preoperative depression, postoperative pain, and functional outcomes, according to several systematic reviews and meta-analyses. Higher levels of depression before surgery are associated with higher levels of knee disability and stiffness, as well as worse pain and function and a lesser improvement in pain and function. [28,29]

#### ***Anxiety:***

Anxiety is a broad term used to describe a range of fear-related symptoms across a spectrum of severity. Individuals with anxiety may experience cognitive (e.g., worry and threat-oriented attentional focus), emotional (e.g., fear), physiological (autonomic arousal, including elevated heart rate and respiration), and behavioural symptoms (e.g., avoidance). [30]

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A high prevalence rate of 92.6% of elective surgery patients experience anxiety prior to surgery. However, the proportion of elective surgery patients who experience severe anxiety prior to surgery (40.5%) is higher. After TKA, preoperative anxiety leads to higher pain severity, decreased function, and chronic pain. [31]

### *Psychotherapy for Anxiety and depression:*

These symptoms can be modifiable through the implementation of a range of cost-effective evidence-based interventions, including:

- Cognitive-behavioral therapies (CBT),
- Interpersonal therapy,
- Mindfulness-based cognitive therapy,
- Problem-solving therapy,
- Acceptance and commitment therapy (ACT),
- Psychoeducation and antidepressant medication. [32]

In order to improve postoperative recovery, it would be beneficial to identify patients for TKA and implementing intervention strategies that can mitigate the adverse effects of anxiety and depression would be possible with the preoperative assessment of anxiety. Many scientists investigated the role that mental health may play in healing after surgery. During surgery and during recovery, patients are anxious because they anticipate harm and discomfort. In this way, psychological stress may negatively affect the patient's recovery from surgery. Psychological stress and physical trauma experienced by patients during surgery and recovery are often assessed in clinical studies.

Beaupre LA examined the effects of preoperative depressive symptoms on postoperative recovery in patients following total joint arthroplasty (TJA). They used Center for Epidemiologic Scale for Depression score for scoring the depressive symptoms with the primary outcome as Western Ontario McMaster Osteoarthritis Index (WOMAC) pain and function. According to the study's results, depressive symptomology preoperatively was associated with postoperative WOMAC pain scores. [33]

Ankle arthroplasty outcomes were studied by Cunningham DJ following total ankle arthroplasty. In order to measure patient-reported outcomes, the SF-36 Mental Component Summary (MCS) scores were used. During the study, prospective outcomes were assessed with a minimum follow-up of one year. Results of the study showed that mental health and depression had a negative impact on patient-reported outcomes following various orthopaedic surgeries, including total ankle replacements. Compared with patients who did not have depression or low preoperative MCS scores, patients with depression had significantly worse final outcome scores, as well as SF-36 PCS and VAS pain scores improved less. In depression patients, patients with low preoperative MCS scores had poorer final outcomes. [34]

Moghtadaei M, investigated the influence of psychological status and physical and mental health on the outcome of patients undergoing TKA. In fifty-two cases of unilateral TKA, the Oxford Happiness Inventory, the Eysenck Personality Inventory, a 12-item short form health survey, and the Knee Injury and Osteoarthritis Outcome Score were used to assess personality traits, depression, physical and mental health, and function prior to surgery. Using the SF-12 and KOOS, health-related quality of life (HRQL) and function were assessed one year after surgery. [35]

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The literature regarding psychosocial variables as predictors for physical outcomes after THA or TKA is highly inconsistent. However, most of the research evidence and association between preoperative psychological behavior and post-surgical recovery of patients from joint replacement surgeries. In India, almost no studies have recognized the significance of psychological factors in recovering patients who have undergone joint replacement surgery. Clinical psychology in India is severely lacking in the literature. India has made great strides in orthopaedic surgeries. Furthermore, involving a psychologist in the care of TJRs patients can improve their recovery and surgery success rates.

### *Increased Medical Acceptance of Clinical Psychologists*

As our country's medical care system evolves over the following decades, the role of clinical psychologists in the hospital will continue to change. Health psychologists are becoming more accepted in the medical community, leading to the development of short-term behavioural interventions that address health-related problems. A psychologist can diagnose patients and assess a patient's level of functioning, which can be used as a basis for therapeutic intervention. Additionally, psychologists assist with pre- and postoperative preparation, pain control, medication and treatment compliance interventions, and behavioral programs that teach self-care after discharge. Furthermore, they diagnose and treat psychological problems that can complicate patient care, such as anxiety and depression. [36]

## CONCLUSION

The present review focuses on the psychological impact of psychological well-being on patients undergoing TJRs, with a special focus on the Indian population. From the literature evidence, the involvement of clinical psychologists in counselling and informing patients fully about the procedures and sensations involved in unpleasant surgical procedures and outcomes improve their adjustment. In order for any health-related discipline to flourish, it must demonstrate a strong track record as a research domain in addition to an intervention basis. Health psychology is well on its way to fulfilling both tasks. For conclusive evidence of the influence of psychological preparation on postoperative recovery in TJRs patients, large randomized controlled trials and further analyses are required.

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