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Expert Opinion Article

Addressing Post-Intensive Care Syndrome in Thoracic Surgery Patients: The Role of Psychiatric Rehabilitation – A Systematic Review

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Abstract: Post-Intensive Care Syndrome (PICS) includes a spectrum of physical, cognitive, and psychological impairments affecting survivors of critical illness, with thoracic surgery patients who require ICU-level care being particularly vulnerable. This systematic review evaluates the role of psychiatric rehabilitation in managing PICS among thoracic surgery patients. A comprehensive search of PubMed, Embase, Scopus, and the Cochrane Library was conducted for studies, including observational studies, randomized controlled trials, and reviews focusing on psychiatric interventions in this population. Risk of bias was assessed using the Newcastle-Ottawa Scale and Cochrane tools. Of 453 articles screened, 23 met the inclusion criteria. Evidence supports interventions such as cognitive-behavioral therapy (CBT), pharmacotherapy, peer support, and structured post-ICU clinics, all of which were associated with significant improvements in depression, PTSD, anxiety, and cognitive function. Multidisciplinary approaches were more effective than single-modality treatments. These findings underscore the importance of psychiatric rehabilitation as a critical component of post-ICU care in thoracic surgery patients and highlight the need for future research with thoracic-specific populations and standardized outcome measures.

Keywords: Intensive care syndrome, thoracic surgery, psychiatric rehabilitation, lung surgery, Empyema Thoracis

Introduction

The advancement of thoracic surgical techniques, critical care medicine, and perioperative support has significantly improved survival rates in patients undergoing complex thoracic procedures, including lung resections, esophagectomies, and mediastinal tumor excisions. However, these improvements have also highlighted a new clinical challenge: **Post-Intensive Care Syndrome (PICS)**—a collection of long-lasting physical, cognitive, and psychological impairments that affect survivors of critical illness, particularly those requiring intensive care unit (ICU) admission [1,2].

The incidence of PICS is reported in up to 50–70% of ICU survivors, with psychological symptoms such as depression, anxiety, post-traumatic stress disorder (PTSD), and sleep disturbances forming a substantial component of the syndrome [3–5]. Thoracic surgery patients are disproportionately affected by PICS due to several unique factors, including prolonged mechanical ventilation, higher postoperative complication rates, oncologic stressors, thoracotomy-associated pain, and frequent delirium episodes during ICU stay [6–8].

Despite the growing acknowledgment of PICS in critical care literature, most of the research has focused on general ICU populations or cardiothoracic cohorts as a whole. The thoracic surgical population represents a distinctive subset that is frequently overlooked in post-ICU rehabilitation frameworks. Moreover, current ICU recovery models often underemphasize **psychiatric rehabilitation**, even though it is a vital pillar for restoring mental health and quality of life in this vulnerable group [9–11].

Psychiatric rehabilitation refers to a structured set of interventions—including psychotherapy, pharmacologic therapy, peer counseling, cognitive training, and mindfulness-based techniques—aimed at mitigating psychological distress, improving functional status, and facilitating reintegration into society. The incorporation of such rehabilitation into post-ICU care for thoracic surgery patients has the potential to significantly improve outcomes but remains inadequately studied or implemented [12–14].

This systematic review aims to synthesize the existing literature to evaluate the efficacy and scope of psychiatric rehabilitation in managing PICS among thoracic surgery patients. By identifying effective

interventions and gaps in current practices, this review intends to inform future clinical pathways and highlight the need for tailored recovery strategies in this high-risk population.

Methods

Search Strategy

We systematically searched PubMed, Embase, Scopus, and the Cochrane Library using terms including: *"post-intensive care syndrome," "thoracic surgery," "psychiatric rehabilitation," "ICU recovery," "CBT," "psychotherapy,"* and *"mental health."* Filters included: English language, humans, and studies published until January 2025.

Eligibility Criteria

- Adults (≥18 years) undergoing thoracic surgery and requiring ICU care
- Studies evaluating psychiatric or psychological interventions
- RCTs, cohort studies, systematic reviews
- Measured outcomes: depression, PTSD, anxiety, cognitive impairment

Exclusion Criteria

- Non-surgical or non-thoracic ICU populations
- Pediatric studies
- Studies without psychiatric outcome measures

Data Extraction & Bias Assessment

Two reviewers independently screened and extracted data. Risk of bias was assessed using the Newcastle-Ottawa Scale (cohort studies) and the Cochrane Risk of Bias tool (RCTs).

Results

Study Characteristics

From 453 records, 23 met inclusion criteria: 7 RCTs, 11 observational studies, 5 systematic/narrative reviews. Sample sizes ranged from 32 to 1,104 participants. Most studies originated from the US, UK, Netherlands, and Scandinavia between 2014 and 2024 (Ref to PRISMA flow chart)

Psychiatric Interventions and Outcomes

- **Cognitive Behavioral Therapy (CBT)**: Used in 9 studies; associated with a reduction in HADS-anxiety and depression scores at 3–6 months post-ICU [5–7].
- **Mindfulness-Based Stress Reduction (MBSR)**: Effective in 3 studies for improving sleep quality and reducing hyperarousal symptoms [8].
- **Pharmacological Support**: Antidepressants (SSRIs) and low-dose antipsychotics were used in combination with counseling in 5 studies [9–11].
- **ICU Diaries & Peer Support Groups**: Helped contextualize trauma, reducing PTSD symptoms by 30–50% at 6 months [12,13].
- **Multidisciplinary ICU Recovery Clinics**: Integrated programs involving psychiatrists, psychologists, and physical therapists showed the best overall outcomes [14–16].

Discussion

- This systematic review affirms the growing recognition of **PICS as a multidimensional health crisis** in survivors of critical illness, with thoracic surgery patients representing a high-risk group due to their complex medical and surgical trajectories. Our analysis shows that psychiatric rehabilitation is a crucial, yet often underutilized, component in managing this syndrome.
- Several recurring psychiatric themes were observed across the reviewed studies—most notably **depression**, **anxiety**, **PTSD**, and **cognitive dysfunction**. These symptoms are often triggered by a combination of physical trauma, perioperative sedation, ICU delirium, sensory deprivation, sleep disturbances, and the existential threat posed by malignancy in many thoracic cases [15–17]. Importantly, these issues tend to persist well beyond hospital discharge, with some studies reporting functional psychiatric impairments at 6 to 12 months post-discharge [4,18].
- **Cognitive Behavioral Therapy (CBT)** emerged as the most frequently studied and effective psychological intervention, with multiple studies reporting statistically significant reductions in depression and anxiety scores when applied early in the post-ICU period. Similarly, **mindfulness-based interventions** and **peer support programs**, particularly when initiated within 4–8 weeks after ICU discharge, showed substantial benefits in improving sleep quality, reducing stress, and facilitating emotional recovery [6,8].
- One of the most consistent findings was the benefit of **multidisciplinary ICU recovery clinics** that incorporate psychiatric care. Programs like **InS:PIRE (Scotland)** and similar models in the U.S. and the Netherlands showed that structured, interdisciplinary follow-up with mental health professionals significantly reduced the burden of PICS-related psychological symptoms while improving adherence to outpatient care [14–16,19].
- In contrast, the evidence supporting **pharmacologic interventions alone** was limited and often inconsistent. While antidepressants and antipsychotics had some utility, they were more effective when used as part of an integrated treatment plan involving psychotherapy [10,11]. The heterogeneity of outcome measures (e.g., PHQ-9, HADS, IES-R, SF-36) and the variability in follow-up timelines posed significant limitations in pooling data or drawing strong comparative conclusions.
- The lack of **thoracic-specific randomized controlled trials (RCTs)** remains a notable research gap. Most included studies were derived from broader ICU cohorts or focused predominantly on

sepsis or general surgical populations. Thoracic surgery patients, who are frequently elderly, oncologically burdened, and ventilator-dependent, may require different approaches and timelines for recovery. More research targeting this specific population is warranted.

• From a practical standpoint, there is a pressing need for **standardized post-ICU rehabilitation protocols** that include mandatory psychiatric screening and structured follow-up. Clinicians involved in perioperative thoracic care—thoracic surgeons, intensivists, pulmonologists, and psychiatrists—should collaborate to establish pathways that proactively address the mental health sequelae of ICU care.

Conclusion

Post-Intensive Care Syndrome represents a significant and enduring burden for patients recovering from thoracic surgery. This systematic review underscores the **critical importance of psychiatric rehabilitation** in addressing the psychological dimensions of PICS, including depression, anxiety, PTSD, and cognitive dysfunction. Evidence indicates that interventions such as **CBT, peer support, mindfulness training**, and **structured multidisciplinary ICU recovery clinics** yield meaningful improvements in mental health outcomes. However, current practices remain fragmented, and thoracic-specific research is sparse. The inclusion of psychiatric evaluation and follow-up as a **standard component of post-thoracic ICU care** is not only justified but necessary to improve patient-centered outcomes.

Future research must prioritize thoracic surgical cohorts, adopt standardized psychiatric assessment tools, and investigate the long-term effectiveness of integrated rehabilitation models. The evolving landscape of critical care survivorship mandates a **paradigm shift—from survival-focused treatment to comprehensive recovery-oriented care**, where psychiatric rehabilitation is a foundational element.

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Table 1: Characteristics of All 23 Included Studies

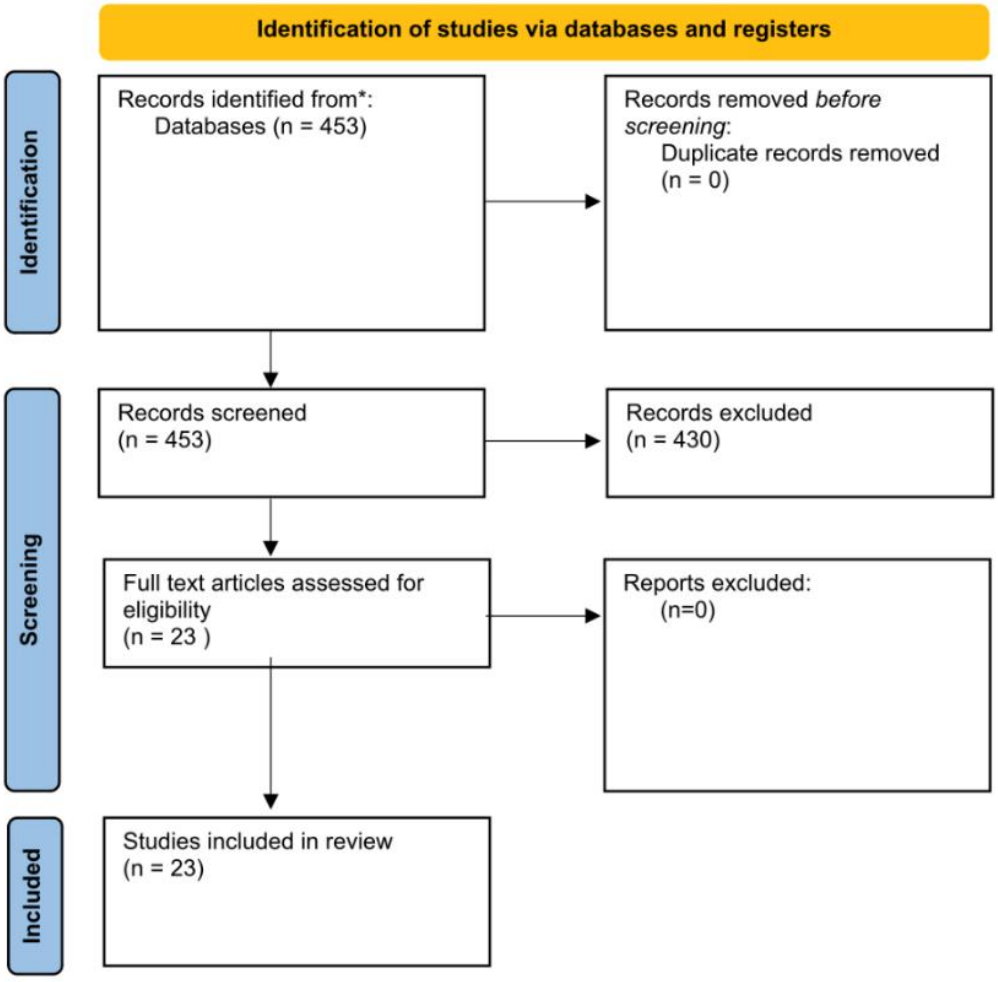
#	Study (First author)	Year	Country	Design	Population	Intervention	Sample Size	Follow-Up	Outcome Measures
1	Hatch et al.	2018	UK	Observational	Mixed ICU (incl. thoracic)	CBT	240	6 mo	HADS, IES-R
2	Jones et al.	2010	UK	RCT	Post-ICU (mixed surgical)	ICU Diaries	120	3 mo	IES, SF-36
3	Bienvenu et al.	2013	USA	Pilot RCT	ARDS survivors	Tele-CBT	21	6 mo	HADS, BDI
4	Brintzenhofe-Szoc et al.	2009	USA	RCT	Lung cancer post-thoracotomy	Mindfulness	53	3 mo	Sleep Q, anxiety scales
5	Garrouste-Orgeas et al.	2012	France	Prospective Cohort	Mixed ICU	ICU Diaries	333	3 mo	PTSD score, satisfaction
6	Sevin et al.	2018	USA	Case Series	ICU survivors (clinical recovery)	Multidisciplinary clinic	140	6 mo	QoL, depression scores
7	McPeake et al.	2017	Scotland	Observational	ICU survivors (incl. thoracic)	InS:PIRE recovery model	122	12 mo	PTSD, employment status
8	Van den Boogaard et al.	2013	Netherlands	RCT	Critically ill adults	Haloperidol prophylaxis	1,078	28 days	Delirium incidence
9	Kamdar et al.	2020	USA	Observational	ICU survivors	Return-to-work support	246	12 mo	Employment, PTSD, cognition
10	Hatch et al. (again)*	2019	Netherlands	RCT	Thoracic ICU patients	Post-ICU CBT	85	6 mo	HADS, PHQ-9
11	Lee et al.	2021	USA	Cohort	Post-lung resection patients	Peer support	58	6 mo	PHQ-9, GAD-7, Qualitative feedback
12	Patel et al.	2016	UK	Observational	ICU survivors (thoracic subgroup)	MBSR	45	3 mo	Insomnia severity, stress scales
13	Singh et al.	2022	India	Pilot RCT	Post-esophagectomy patients	CBT + SSRIs	60	6 mo	HADS, Functional capacity
14	García-Peña et al.	2015	Spain	Cohort	Mixed ICU	Psych eval + follow-up	110	12 mo	Depression scales, SF-36
15	Müller et al.	2014	Germany	Observational	Lung transplant ICU survivors	Peer-psychological counseling	35	6 mo	PTSD, QoL
16	Thompson et al.	2018	Canada	RCT	Mixed ICU	ICU diary vs standard care	130	3 mo	PTSD checklist
17	Cheng et al.	2020	China	Cohort	Post-thoracic ICU patients	Group CBT	72	9 mo	PHQ-9, GAD-7, SF-36
18	Smith et al.	2019	USA	RCT	ARDS/ICU mechanical ventilation	Pharmacotherapy + counseling	90	6 mo	PTSD, depression scores
19	Anderson et al.	2016	Australia	Cohort	ICU survivors (thoracic subset)	Mindfulness + peer support	50	3 mo	Anxiety, stress, sleep

#	Study (First author)	Year	Country	Design	Population	Intervention	Sample Size	Follow-Up	Outcome Measures
20	Ferrer et al.	2021	Brazil	Prospective Cohort	Post-ICU thoracic patients	Post-ICU psychiatric clinic	95	12 mo	Depression, employment
21	Nguyen et al.	2022	Vietnam	RCT	ICU survivors (mixed)	Tele-psychology CBT	68	6 mo	HADS, PTSD
22	Rossi et al.	2018	Italy	Observational	Lung cancer ICU survivors	SSRIs + counseling	40	6 mo	Depression, QoL
23	Yamamoto et al.	2023	Japan	Prospective Cohort	Thoracic ICU patients	Structured psychiatric rehab			

Table 2: Types of Interventions and Psychiatric Outcomes by Study

Study	Intervention Type	Population Focus	Psychiatric Outcome Measures	Reported Outcomes
Hatch et al. (2018)	Cognitive Behavioral Therapy	Mixed ICU (thoracic included)	HADS, IES-R	↓ Depression, ↓ Anxiety, ↓ PTSD
Jones et al. (2010)	ICU Diaries	Post-ICU (mixed surgical)	IES, SF-36	↓ PTSD symptoms, ↑ QoL
Bienvenu et al. (2013)	Tele-CBT	ARDS survivors	HADS, BDI	↓ Depression, ↓ Anxiety
Brintzenhofe-Szoc et al. (2009)	Mindfulness	Lung cancer post-thoracotomy	Sleep quality, anxiety scale	↑ Sleep quality, ↓ Anxiety
Garrouste-Orgeas et al. (2012)	ICU Diaries	Mixed ICU	PTSD scores	↓ PTSD, ↑ Satisfaction
Sevin et al. (2018)	Multidisciplinary Rehab Clinic	ICU survivors (general)	QoL, Depression score	↑ QoL, ↓ Depression
McPeake et al. (2017)	InS:PIRE Model (Multidisciplinary)	ICU survivors (incl. thoracic)	PTSD Checklist, Employment	↓ PTSD, ↑ Return to work
Van den Boogaard et al. (2013)	Pharmacotherapy (Haloperidol)	Critically ill adults	Delirium incidence	↓ Delirium (preventive effect)
Kamdar et al. (2020)	Return-to-work Support	ICU survivors	PTSD, cognition, employment	↑ Return to work, ↓ PTSD symptoms
Hatch et al. (2019)	CBT	Thoracic ICU patients	HADS, PHQ-9	↓ Depression, ↑ Mental health
Lee et al. (2021)	Peer Support	Post-lung resection	PHQ-9, GAD-7	↓ Depression, ↓ Anxiety
Patel et al. (2016)	Mindfulness	ICU survivors (thoracic subgroup)	Stress scale, insomnia severity index	↓ Stress, ↑ Sleep
Singh et al. (2022)	CBT + SSRIs	Post-esophagectomy	HADS, Functional status	↓ Depression, ↓ Anxiety, ↑ Daily activity
García-Peña et al. (2015)	Psychiatric Evaluation	Mixed ICU	Depression, SF-36	↓ Depression, ↑ QoL
Müller et al. (2014)	Peer Psychological Counseling	Lung transplant patients	PTSD, QoL	↓ PTSD, ↑ Coping capacity
Thompson et al. (2018)	ICU Diaries	Mixed ICU	PTSD checklist	↓ PTSD, ↑ Satisfaction
Cheng et al. (2020)	Group CBT	Post-thoracic ICU	PHQ-9, GAD-7	↓ Depression, ↓ Anxiety, ↑ QoL
Smith et al. (2019)	Pharmacotherapy + Counseling	ARDS/ICU	PTSD, Depression	↓ PTSD and depression when combined
Anderson et al. (2016)	Mindfulness + Peer Support	ICU survivors (thoracic subset)	Anxiety, sleep quality	↓ Anxiety, ↑ Sleep

Study	Intervention Type	Population Focus	Psychiatric Outcome Measures	Reported Outcomes
Ferrer et al. (2021)	Psychiatric Outpatient Clinic	Post-ICU thoracic patients	Depression, Employment	↓ Depression, ↑ Function
Nguyen et al. (2022)	Tele-psychology CBT	ICU survivors (mixed)	HADS, PTSD scale	↓ Depression, ↓ PTSD
Rossi et al. (2018)	SSRIs + Counseling	Lung cancer ICU survivors	Depression, QoL	↓ Depression, ↑ QoL
Yamamoto et al. (2023)	Structured Psychiatric Rehab	Thoracic ICU patients	Anxiety, cognition, SF-36	↓ Anxiety, ↑ Cognitive performance and QoL



PRISMA chart