Cultural Article

Post Intensive Care Syndrome in patients affected by COVID-19

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Abstract

Despite improvements in survival rates within the ICU over the years, a substantial number of patients continue to struggle with prolonged return to their initial levels of functionality. The physical, psychological, cognitive, and social alterations that persist beyond hospital discharge due to a critical illness are collectively termed "Post Intensive Care Syndrome" (PICS). This term encompasses patients recovering from critical illnesses and their family members (PICS-F). Considering the potential consequences for COVID-19 patients after discharge from the ICU, this paper aimed to describe the characteristics

and frequency of PICS in this specific population. Owing to the recent emergence of COVID-19, evidence is still lacking in scientific literature. Among patients admitted to the ICUs with COVID-19, there is a notably high incidence of alterations in at least one dimension (physical, psychological, cognitive, and social). These observed alterations appear to be comparable to those found in non-COVID-19 patients. However, owing to the limited number of studies in the current literature, this cannot be definitively demonstrated. Similar to non-COVID-19 patients, the implementation of the ABCDEF bundle should be considered for COVID-19 patients to prevent PICS. The published literature underscores the profound impact of COVID-19 on patients admitted to ICUs, resulting in significant alterations in the physical, psychological, and cognitive dimensions of post-intensive care syndrome. However, clinical heterogeneity was present in the reported data, and various assessment scales were employed in different studies for each domain. To address this issue, adoption of standardized assessment tools as part of post-ICU follow-ups at consistent intervals for all patients is recommended.

Keywords: Post Intensive Care Syndrome; COVID-19; ABCDE Bundle; Prevention; Nursing.

From Post-Intensive Care Syndrome in general ICU populations to its occurrence in the COVID-19 ICU patients

In recent years, intensive care unit (ICU) teams have shifted their focus towards examining long-term outcomes in patients who survive critical illnesses and intensive treatments[1]. Among the enduring consequences are impairments in muscular, respiratory, renal, and cardiovascular functions[2]. Despite improvements in survival rates in the ICU over the years[1], a substantial number of patients continue to struggle with a prolonged return to their initial levels of functionality[3]. The physical, psychological, cognitive, and social alterations that persist beyond hospital discharge due to a critical illness are collectively termed "Post Intensive Care Syndrome" (PICS)[4]. This term encompasses both patients recovering from critical illnesses and their family members (PICS-F)[3]. The symptoms associated with PICS can be categorized into four dimensions: physical dysfunction, psychological dysfunction, cognitive impairment, and social dysfunction. Physical dysfunction includes alterations in lung functionality[5] and spirometry values, acquired neuromuscular weakness[6], fatigue[7], loss of appetite, and weight loss. Psychological dysfunction manifests as depression, anxiety[8], and post-traumatic stress disorder (PTSD)[9], with approximately 30% of patients experiencing clinically significant depressive symptoms in the first 12 months after ICU admission[10]. Cognitive impairment involves compromised memory[11,12], poor executive function, weakened language, inattention, and worsening of dementia (if present). Social dysfunction encompasses difficulties in self-care[13], challenges in reintegrating into society[11,14], and resuming work[15].

ICU admission is recognized not only as a physical challenge for patients, but also as a significant psychological stressor for family members, leading to potential mental health issues known as PICS-F[16]. Risk factors include female sex, young age, low education level, and previous experiences of mental health disorders[16]. Up to 75% of ICU patients' family members develop symptoms consistent with PICS-F, with one-third of them requiring psychotropic medication treatment[17]. In 2017, the Society of Critical Care Medicine published guidelines encouraging family involvement in ICUs[18]. Four recommendations aim to enhance outcomes for both the admitted patient and the family[18], including the implementation of open ICU policies, allowing family presence during resuscitation maneuvers, using patient diaries, and actively involving family members in the

care process[18]. Prevention of PICS is achievable through the application of the ABCDEF bundle, encompassing "Assess, Prevent, and Manage Pain"; "Both Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT)"; "Choice of analgesia and sedation"; "Delirium: Assess, Prevent, and Manage; Early mobility and Exercise; and Family engagement and empowerment"[19,20]. The bundle is composed of multi-professional interventions aimed at liberating patients early from sedation and mechanical ventilation, thereby preventing delirium and immobility syndrome, which are major impediments to short-term psychophysical recovery.

Early mobilization and rehabilitation are pivotal interventions included in the ABCDE Bundle with the aim of preventing PICS [21]. Implementing early stage rehabilitation activities has the primary goal of enabling admitted individuals to enhance their quality of life by regaining maximum independence in daily activities, considering the available resources and disease stage[22].

In terms of psychosocial recovery, the innovative use of shared diaries between family members and health care professionals has emerged as one of the most relevant interventions in recent years[23]. Diaries aid in orienting patients and alleviating symptoms of anxiety, depression, and PTSD after hospitalization. Compiled by healthcare staff or family members, diaries record the patient's status, general notes on daily events, and rehabilitation situation, leading to a better understanding of the fears and changes that patients have undergone during ICU hospitalization[23].

With the onset of the COVID-19 pandemic, intensive care units have routinely managed critically ill patients as well as those afflicted by the SARS CoV2 virus, resulting in severe organ failure. SARS CoV2 patients comprised the majority of ICU admissions during the pandemic. Consequently, new studies have investigated the potential occurrence of PICS in patients hospitalized in the ICU for SARS CoV2[24,25.] Patients with COVID-19 who underwent ICU admission not only faced the risk of developing PICS but also the possibility of experiencing the so-called "long COVID" syndrome, which may exert a further negative impact on post-ICU admission outcomes[26]. The term "long COVID" refers to signs and symptoms developing during or after a COVID-19-compatible infection that persist for more than 12 weeks, often presenting with a range of fluctuating symptoms affecting various body systems[27]. Common symptoms include fatigue and shortness of breath[28], and associated psychological symptoms such as PTSD, depression, and anxiety[29], potentially elevating the risk of developing mental health problems. A long COVID period can be debilitating, influencing functional independence and work capacity[30]. A study by the Office of National Statistics (ONS) found that patients hospitalized with COVID-19 also have elevated risks of developing diabetes, cardiovascular events, and respiratory diseases after discharge[31]. Considering the potential consequences for COVID-19 patients after discharge from the ICU, this paper aimed to describe the characteristics and frequency of PICS in this specific population.

Dimensions of PICS in COVID-19 ICU survival patients

The first thing to take into consideration when attempting to provide a measure of the occurrence of PICS in COVID-19 ICU patients is that PICS is a syndrome; therefore, the dimensions of this issue are related to the incidence of every kind of impairment that ICU survivors can experience.

The search for alterations in the physical dimensions and their consequences for COVID-19 survivors is a common focus in the literature. Various assessment scales, including the Activity Daily Life (ADL) scale[32], Modified Rankin Scale (mRS)[33], 20-item Multidimensional Fatigue Inventory[34], Barthel[35], EQ-5D-3L Health-Related Quality-of-Life (EuroQol-5D-3L)[33,35,36,37], Short-Form General Health Survey-20 items (SF-20)[32], and Short Form Health Survey-36 items (SF-36)[38], have been used to evaluate these physical changes.

Numerous studies delve into the physical outcomes[32,33,35,39]. Rousseau et al.[35] noted that 87.5% of the patients did not regain autonomy in daily activities. Daste et al.[39] highlighted weakness and neurological impairment as the most common physical manifestations of PICS one month after discharge, affecting 59% of patients, with only 9% showing central involvement. At three months, musculoskeletal damage emerged as the prevalent physical manifestation in 58% of patients, as indicated by Martillo et al.[33], who also demonstrated motor disability in 58% of the interviewed patients. Van Veenendaal et al.[32] observed compromised physical function after ICU admission, with a median SF-20 scale score of 33.3 (IQR 16.7–66.7) and 50 (IQR 16.7–83.3)

at 3 and 6 months of follow-up, respectively. Gilmartin et al.[37] reported that at 6 months, only 59% (13/22) of patients were independent in activities of daily living assessed with the ADL scale, and 57% had returned to work within 6 months of ICU discharge.

The presence of psychological alterations in COVID-19 patients admitted to the ICUs has been stressed in the literature. These patients were assessed using various scales, such as the Posttraumatic Symptom Scale (PTSS-10), Intensive Care Psychological Assessment Tool (IPAT), Pittsburg Sleep Quality Index (PSQUI), Frontal Assessment Battery (FAB), Hospital Anxiety and Depression Scale (HADS), Acute Physiologic Assessment and Chronic Health Evaluation II (APACHE II), and Impact of Event Scale-Revised (IES-R), revealing predominantly states of anxiety, depression, and PTSD (Table 1).

Table 1. Strategies recommended to prevent complications associated with PICC management (Nickel et al., 2024; Brescia et al., 2024).

MANAGEMENT
Aseptic technique
Hand washing before insertion and manipulation of a catheter
Maximal barrier precaution (mask, gown, glove, sterile drapes).
Appropriate vein selection
Use of polyurethane catheter
Determine catheter type and size as appropriate
Perform skin antisepsis at the PICC site prior to placement and as part of routine site care
Assess the PICC insertion and/or exit site for signs and symptoms of infection
Push-pause technique while flushing
In-service education and training to nurses and caregivers
Develop specific PICC guidelines and prevention strategies in every PICC unit in the hospital
Prevent catheter dislodgement (partial or complete) through appropriate catheter securement
Check for incompatibility when 2 or more drugs/ solutions are infused together
Use chlorhexidine gluconate (CHG)-containing dressings to prevent unless contraindicated (eg, sensitivity or allergy to CHG)
Obtain paired blood samples for culture when CRBSI is suspected to definitively diagnose
Change transparent semi-permeable membrane (TSM) dressings at least every 7 days or immediately if the integrity of the dressing is compromised or if there is evidence of compromised skin integrity under the dressing

Legend. PICC, Peripherally Inserted central catheter; CHG, chlorhexidine gluconate; CRBSI, catheter-related bloodstream infection

Note. Interventions according to Nickel et al., 2024, Brescia et al., 2024

The HADS scale was most frequently used in published studies[32,35,36,37,38] , confirming the presence of anxiety and depression disorders in patients surviving ICU admission for COVID-19[24,32,33,34,36,37,38]. Weidman et al.[37] found that 29% of patients who completed their survey were positive for depression, 21% for anxiety, and 13% for post-traumatic stress symptoms. In a study performed by Vlake et al.[38], the severity of PTSD decreased during follow-up, while the severity of anxiety and depression symptoms and the proportion of patients reporting probable PTSD remained similar. Gilmartin et al.[32] found that the average score on the Intensive Care Psychological Assessment Tool (IPAT) for PTSD was high. Vlake et al.[38] also noted that survivors of COVID-19 ICU had better mental Health-Related Quality of Life (HRQoL) at three months post-hospital discharge compared to patients in a historical cohort[32]. Using the 3-Level Version of EuroQoL-5D, Martillo et al.[33] assessed that 48% of patients reported alterations in the psychiatric domain, 8% had cognitive screening alterations, and 18% exhibited moderate to severe

depression. Ninety-one percent of patients met the criteria for PICS.

In studies evaluating cognitive impairment, the Montreal Cognitive Assessment scale (MoCA) was used[33,34,35,32,37,39]. Martillo et al, reported that 48% of ICU survival patients (22/45) had alterations in the psychiatric domain, and 8% (4/45) in cognitive screening.[33] Morin et al. found cognitive impairment (according to the MoCA scale) in 42% (21/50) of intubated patients. Only the study conducted by Weidman et al. reported a lower rate of cognitive impairment: 25% (15/59)[37].

Only Van Veenendaal et al.[40] analyzed social alterations, focusing on delayed return to work due to lingering physical issues six months after discharge in 43% of patients. In the same study, using the McMaster Family Assessment Device (FAD-GF6+), family dysfunctions resulting from ICU admission of their loved ones were assessed. This evaluation revealed that 68% of the involved family members described the isolation and social distance from their loved ones as "difficult"[40].

Are there differences in the features and prevention measures of PICS between COVID-19 patients and other critically ill patients?

Owing to the recent emergence of COVID-19, the existing literature lacks extensive evidence regarding the features of PICS in ICU survivors. Among patients admitted to the ICUs with COVID-19, there is a notably high incidence of alterations in at least one dimension (physical, psychological, cognitive, and social). These observed impairments appear comparable to those observed in non-COVID-19 patients[38]. However, this cannot be definitively demonstrated due to the limited number of studies in the current literature.

In COVID-19 survival patients, physical alterations are predominantly observed in selected studies, manifesting as symptoms, such as weakness and impaired autonomy in daily life activities. The results also revealed compromises in the psychological dimension, including depression and anxiety, as well as aspects of the social dimension, such as a delayed return to work.

Similar to non-COVID-19 patients, implementation of the ABCDEF bundle should be considered for COVID-19 patients to prevent PICS[41,42]. Liu et al.[41] evaluated the utilization of different elements of the ABCDEF bundle in COVID-19 patients, with the following percentages: A - Assess, Prevent, and Manage Pain (45%); B - Both SAT and SBT (28%); C - Choice of analgesia and sedation (52%); D - Delirium: Assess, Prevent, and Manage (35%); E - Early mobility and Exercise (47%); and F - Family engagement and empowerment (16%). Relatively high rates of elements A, C, and D in mechanically ventilated patients may reflect the need for significant pain management, increased sedation, agitation, and delirium control to stabilize symptoms, such as severe coughing, exacerbation of lung damage, or a threefold higher risk of early extubation, compared with non-COVID-19 patients[41]. The limited implementation of Phase F may have been influenced by the contagious nature of COVID-19:63% of family members reported discomfort due to the distance from their hospitalized relatives in the ICU[40].

Another factor affecting families and the patient's social dimension is the return to work by family members. Moreover, only 10% of employed patients' pre-ICU admissions returned to service[40].

The pandemic has brought attention to gaps in the system's response to rehabilitative and social needs after discharge from the ICU and the hospital. The English national guidelines recommend a multidisciplinary follow-up system 2-3 months after discharge for individuals hospitalized in the ICU for more than 4 days to assess their rehabilitation phase conditions and their impact on quality of life[43,44].

The Intensive Care Society has published a document for use in rehabilitative follow-up, investigating physical and psychological aspects, such as mental health and post-ICU family stress for both COVID-19 and non-COVID-19 patients. Concurrently, they released guidelines for its use during the rehabilitation phase of patients surviving COVID-19[45]. In 2021, Morgan A. reported how COVID-19 survivors have a reduced quality of life at 6 months, especially in the psychological and physical spheres[44].

Furthermore, the consequences of ICU admission can influence not only the well-known physical, cognitive, and social dimensions but also the economic dimension. The pandemic has shed light on the significance of expenses borne by the healthcare system and individual families both before and post-ICU admission, opening new opportunities for research in this

field, which is still lacking in data[44].

CONCLUSIONS

The existing literature underscores the profound impact of COVID-19 on patients admitted to ICUs, resulting in significant alterations across all dimensions of post-intensive care syndrome. Clinical heterogeneity was apparent in the reported data with various assessment scales employed in different studies for each dimension. To address this issue, adoption of standardized assessment tools as part of post-ICU follow-ups at consistent intervals for all patients is recommended. This approach ensures that follow-up is a replicable and comparable assessment intervention applicable across diverse geographic contexts.

Moreover, early recognition of PICS in COVID-19-positive patients is essential, emphasizing the need to implement the best preventive practices to enhance the post-hospitalization quality of life. The establishment of structured rehabilitation pathways for COVID-19 patients discharged from ICUs, incorporating telemedicine and e-health, is imperative alongside the implementation of post-hospitalizations follow-ups and the existing literature.

It is also crucial to explore the impact of COVID-19 on families and incidence of PICS-F. Caregivers should receive comprehensive information regarding the potential consequences of their loved ones' ICU stay and be aware of the available post-hospitalization rehabilitation and support pathways.

Even if COVID-19 pandemics seem (hopefully) ended, we should take the opportunity to learn from these dramatic events, as many preventive and care interventions as possible, to provide the best healthcare we can during and after the stay in hospital of critically ill patients affected by highly transmissible infectious diseases with a high risk of permanent consequences with a large impact on their residual quality of life.

AUTHORS	DESIGN	SAMPLE and SETTING	MEASUREMENTS	
Daste et al. (2021)[39]	Observational Monocentric Retrospective Study	45 patients admitted to an ICU in France between April 2020 and September 2020. Follow-up at 3 and 6 months.	MRC, MoCA FAB, HADS, PCL-S.	
Gardashkhani et al. (2021)[24]	Descriptive Study	84 patients admitted from September 2020 to February 2021 at a hospital in Iran. Telephone Interviews.	HABC-M SR.	
Gilmartin et al. (2022)[32]	Monocentric Prospective Cohort Study	22 patients admitted to a University Hospital ICU in Ireland, who attended a follow-up outpatient clinic for PICS at 6 months post-hospitalization for SARS-CoV-2 pneumonia.	MoCa, DSM-5, PCL-5, IMS, IPAT, PHQ-9, GAD-7, FSS, IPAQ-SF, APACHEII, ADL.	
Martillo et al. (2021)[33]	Monocentric Descriptive Cohort Study	45 patients enrolled from April to July 2020 admitted to an ICU in the USA. Follow-up after one month with Telemedicine.	EQ-5D-3L, mRS, Dalhousie Clinical Frailty Scale, Neuro-QoL CAT v1.0, Lower Extremity Function, Insomnia Severity Scale; Patient Health Questionnaire-9; PTC-L5, T-MoCa, EQ-5D, Severity Index.	
Morin et al. (2021)[34]	Prospective Cohort Study	478 COVID-19 patients, including 97 ICU-admitted patients in France from March to May 2020. Follow up dopo 3-4 mesi. Follow-up after 3-4 months. Telephone and outpatient assessments.	20-item Multidimensional Fatigue Inventory score, 36-Item Short-Form Health Survey score, MoCA, test d2-R, self-questionnaire McNair.	
Mateo Rodríguez et al. (2021)[36]	Descriptive and Prospective Monocentric Pilot Study	29 patients admitted from March to June 2020 in Spain. Inclusion criteria were discharging 4 to 6 weeks post-ICU stay for pneumonia secondary to SARS-CoV-2 infection.	EQ-5D-3L, MUST, SGA, MoCA, HADS, VAS.	
Rousseau et al. (2021)[35]	Monocentric cohort study	32 COVID-19 survivors discharged from the ICU between March to July 2020 – Belgian hospital. 3-month follow-up post ICU admission.	PSQUI, MoCA, Barthel index, EQ-5D-3L, HADS e IES-R.	
Van Veenendaal et al. (2021)[40]	Prospective Monocentric Cohort Study	72 COVID-19 Survivors in a University Hospital ICU (Netherlands) and 102 Family Members. 3- and 6-Month Follow-Up via Telephone Interview.	SF-20, FAD-GF6+, HADS, CFS, spirometry.	
Vlake et al.(2021)[38]	Multicentric Prospective Observational Study	3 medical-surgical ICUs in the Netherlands. 118 adult patients; post-ICU patients with proven SARS-CoV-2 infection between March 2 and October 17, 2020. Results were compared with a historical cohort of 120 patients. Expected follow-up at 6 weeks, 3 months, and 6 months after hospital discharge.	COVID cohort: IES-R, HADS, EQ-5D, and SF-36, Mental Component Scale-36, and Physical Component Scale-36. Historical cohort: TSQ, HADS.	
Weidman et al. (2021)[37]	Retrospective Cohort Study	63 Patients survived ICU COVID-19 (USA). Follow-up outpatient visits (unspecified time intervals).	HADS, PTSS-10, EQ-5D-3L, MoCA.	

Legend: PSQI (Pittsburg Sleep Quality Index), MoCA (Montreal Cognitive Assessment), EQ-5D-3L Health-Related Quality-of-Life (HRQoL EuroQol-5 Dimension), HADS (Hospital Anxiety and Depression Scale) , IES-R (Impact of Event Scale-Revised), CFS (Clinical Frailty Scale); FAD-GF6+ (McMaster Family Assessment Device), IPAT (Intensive Care Psychological Assessment Tool), SF-20 (Short-Form General Health Survey-20 items), PTSS-10 (Posttraumatic Symptom Scale), HABC-Monitor (Healthy Aging Brain Care Monitor), MRC (Medical Research Council), FAB (Frontal Assessment Battery), IMS (ICU Mobility Scale), ADL (activity daily life), PCL-S (Posttraumatic Stress Disorder Checklist Scale), MUST – Malnutrion Universal Screening Tool, VAS – Visual Analogic Scale, SGA (subjective global assessment), PHQ-9 (Patient Health Questionnaire-9), GAD-7 (General Anxiety Disorder-7), FSS (Fatigue Severity Scale), IPAQ-SF (International Physical Activity Questionnaire-Short Form), APACHE II (Acute Physiologic Assessment and Chronic Health Evaluation), TSQ (Trauma Screening Questionnaire), Neuro-QoL CAT v1.0 (Neuro-Quality of Life Upper Extremity). Telephone Montreal Cognitive Assessment (T-MoCa), mRS (Modified Rankin Scale), SF-36 (Short Form Health Survey-36 items)

		RESULTS
		During the first month after ICU discharge, the most frequent physical manifestation of PICS was neurological impairment and weakness with a MRC score <48/60 in 26/44 (59%) patients. Cognitive manifestations of PICS included delirium (9/45; 20%). 21.9/30 (6.0) had the MoCA questionnaire with average values of 21.9/30 (±6.0), and the average FAB score was 14.1/18 (±3.8). At 3 months post-intensive care unit discharge, the most frequent physical manifestation of PICS was osteoarticular damage (26/45; 58% of patients). The average scores on the HADS scale were 6.6/21 (±5.1) and 6.6/21 (±5.4), and the PCL-S score was 36.4/85 (±18.5).
		It has been demonstrated that 69% (n=58) of these patients exhibit mild to moderate degrees of PICS. It was also found that the only two variables influencing the development of PICS are age and the duration of intensive care admission. The study results showed that the mean (SD) PICS score in discharged patients is ±8.86 (12.50).
		The most common comorbidities in enrolled patients were hypertension, diabetes mellitus, and ischemic heart disease. The median length of ICU stay was 21 days (IQR 2–75 days). At 6 months, only 59% (13/22) of patients were independent for ADL. 8/14 (57%) of patients had returned to work within 6 months of ICU discharge. Their average score on the IPAT was 6.7 (±4.6), with a high average score for PTSD of 21.1 (±17.5).
		The 3-Level Version of EuroQoL-5D was used to assess physical and psychological domains. 86.7% (39/45) had alterations in the physical domain, 48% (22/45) reported alterations in the psychiatric domain, and 8% (4/45) had alterations in cognitive screening. 58% (26/45) had some degree of motor disability. In the psychiatric domain, 18% (8) had moderate to severe depression. 18% (8) presented with PTC-L5 scores suggestive of a post-traumatic stress disorder diagnosis. 41 patients (91.1%) met the criteria for PICS.
		Results are cumulative across all hospital settings, not specific to the ICU. During the telephone interview, 244 patients (51%) reported at least 1 symptom that did not exist before COVID-19: fatigue in 31% (143/431), cognitive symptoms in 21% (86/416), and newly onset dyspnea in 16% (78/478. Further evaluation in 177 patients (37%), including the mean score of the 20-item Multidimensional Fatigue Inventory score was 4.5. The median score of the 36-Item Short-Form Health Survey was 25 (IQR 25.0-75.0). In 108 out of 171 patients (63%), abnormalities in lung scans with computed tomography were found, mainly subtle ground-glass opacities. Cognitive impairment (according to the MoCA scale) was present in 42% (21/50) of intubated cases, and anxiety (HADS-Anxiety) was present in 26% (13/50), again in intubated cases.
		9 out of 10 survivors of SARS-CoV-2 pneumonia admitted to intensive care show at least one alteration related to PICS four to six weeks after hospital discharge.
		87.5% (28/32) of participants did not regain autonomy in daily life activities. The primary alterations were related to the following scores: PSQUI > 5 in 75%, MoCA < 26 in 44%, Barthel < 100 in 31%. 43.8% (14/32) exhibited acceptable intervals for MoCA, IES-R, and Barthel scores.
		60 individuals participated in the 3-month follow-up, and only 50 in the 6-month follow-up. 78 family members responded at 3 months, and 67 at 6 months. Physical functionality was compromised post-ICU admission, with a median score on the SF-20 scale of 33.3 (IQR 16.7–66.7) at 3 months and 50 (IQR 16.7–83.3) at 6 months out of 100, respectively. Social functioning achieved a median value of 60.0 (IQR 40.0-80.0) at three months and 80.0 (IQR 60.0-100.0) at six months. Three out of 30 survivors employed pre-ICU (10%) fully returned to work. At six months, 23 out of 36 family members (64%) had fully returned to work, and 4 (11%) were in the process of reintegration.
		PTSD severity decreased during follow-up (estimated mean difference between 3 and 6 months: -2.43 [95% CI: -4.32 to -0.53]; p = 0.01). The severity of anxiety and depression symptoms and the proportion of patients reporting probable PTSD, anxiety, and depression remained similar. Mental HRQoL was 43.7 (average MCS-36, ±12.2) at 6 weeks, improved at 3 months but remained similar between 6 months and 3 months (estimated mean difference 0.71 [95% CI: -1.15 to 2.56]; p = 0.46). COVID-19 ICU survivors reported better mental HRQoL at 3 months post-hospital discharge than patients in the historical cohort (COVID-19, 45.9 [±13.4] vs. historical cohort, 40.2 [±12.3]; estimated mean difference -8.37 [95% CI: -16.09 to -0.65]; p = 0.04), with higher physical functioning (estimated mean difference -15.18 [95% CI: -29.53 to -0.83]; p = 0.83). 53 to -0.83]; p = 0.04), bodily pain (estimated mean difference -14.92 [95% CI: -29.55 to -0.30]; p = 0.05), role emotional functioning (estimated mean difference -31.19 [95% CI: -54.43 to -7.96]; p < 0.01), and mental health (estimated mean difference -12.63 [-23.20 to -2.06]; p = 0.02).
		29% (18/63) of patients who completed the survey tested positive for depression, 21% (13/63) for anxiety, and 13% (8/63) for post-traumatic stress symptoms. 25% (15/59) have cognitive impairment. Overall, the prevalence of PICS is 90% (61/68).

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