Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/f6spfa82

PREVALENCE AND MANIFESTATIONS OF POST-INTENSIVE CARE SYNDROME IN PATIENTS RECOVERING FROM CRITICAL ILLNESS AT A TERTIARY CARE HOSPITAL IN PAKISTAN

Azeeta Israr[1], Umer Farooq[2*], Arooj Zahra[3], Kashif Iqbal[4], Rabia Asghar[5], Attiqa Khan[6]

[1]FCPS Medicine Consultant Medicine Benazir Bhutto Shaheed Hospital Abbottabad
saadi_kmc@yahoo.com
[2*]FCPS Medicine, Registrar Medicine Jinnah International Hospital Abbottabad
Umerfarooqamc@gmail.com
[3]MBBS, FCPS (Medicine) SR HITEC – IMS Medical Specialist Margalla Hospital Taxila
Lightmusk@hotmail.com
[4]FCPS Medicine SR HITECH -IMS Taxilla Medical Specialist Margalla Hospital PMO Taxilla
drkashif78@gmail.com
[5]MBBS, House Job from Sheikh Zayed Hospital, Lahore, rabiaasghar777@gmail.com
[6]MBBS, House Officer SKBZ CMH, Rawalakot, attiqakhan18@gmail.com

***Corresponding Author:**Dr. Umer Farooq
*Email: Umerfarooqamc@gmail.com

ABSTRACT

Background: Post-Intensive Care Syndrome (PICS) is a collection of physical, cognitive, and psychological impairments that affect patients following critical illness and intensive care unit (ICU) admission. As survival rates improve, the burden of PICS on patient recovery and quality of life has become increasingly recognized.

Objective: The primary objective of this study was to assess the prevalence and manifestations of PICS in patients recovering from critical illness at a tertiary care hospital in Pakistan, focusing on physical, cognitive, and psychological impairments.

Study Setting & Design: This cross-sectional study was conducted at Jinnah International Hospital Abbottabad.

Methodology: A sample of 150 patients taken who had been discharged from the ICU after recovering from critical illness. A structured questionnaire was used to assess PICS components, including physical, cognitive, and psychological impairments. Patients were classified based on the severity of impairments. Data were analyzed using statistical methods to identify associations between ICU-related factors and the presence of PICS.

Results: The study found that 73.3% of patients experienced some form of physical impairment, 53.3% had cognitive impairments, and 66.7% showed psychological symptoms, with anxiety being the most common. Length of ICU stay, mechanical ventilation, and primary diagnosis were significantly associated with the prevalence of PICS.

Conclusion: PICS is highly prevalent among ICU survivors, with significant physical, cognitive, and psychological impacts. Early identification and targeted rehabilitation strategies are essential to improving long-term recovery.

Keywords: Critical illness, ICU, Post-Intensive Care Syndrome, Rehabilitation, Physical impairment, Psychological impairment.

INTRODUCTION

Post-Intensive Care Syndrome (PICS) is a multifaceted condition encompassing physical, cognitive, and psychological impairments experienced by patients who have survived critical illness and undergone intensive care treatment.[1] With advances in critical care medicine, survival rates among patients admitted to intensive care units (ICUs) have improved significantly. However, these patients often face long-term health challenges after discharge, impacting their quality of life and placing substantial burdens on healthcare systems and caregivers.[2]

The manifestations of PICS include physical impairments such as muscle weakness, difficulty in mobility, and chronic fatigue, often resulting from prolonged mechanical ventilation and immobility during ICU stays. Cognitive dysfunction is another hallmark, encompassing memory deficits, attention impairments, and executive function challenges.[3] Psychological symptoms, including anxiety, depression, and post-traumatic stress disorder (PTSD), are also prevalent, further compounding the difficulties faced by survivors.[4,5] Existing literature highlights a variable prevalence of PICS globally, with estimates ranging from 25% to 80% among ICU survivors, depending on the population studied, diagnostic criteria used, and healthcare settings.[6,7] While several studies have been conducted in high-income countries to understand the burden of PICS, data from low-resource settings, including Pakistan, remain scarce. Limited awareness, inadequate follow-up care, and insufficient rehabilitation services in such settings may exacerbate the challenges faced by ICU survivors, leaving a significant gap in the continuum of care.[8]

Critical illnesses requiring ICU admission, such as sepsis, acute respiratory distress syndrome (ARDS), or COVID-19, have further underscored the importance of addressing PICS. During the COVID-19 pandemic, an unprecedented number of patients required intensive care, drawing global attention to the physical and mental health consequences experienced by survivors. This highlighted the need for early recognition and targeted interventions to mitigate the long-term impacts of PICS.[9,10]

Despite the increasing recognition of PICS as a public health concern, there is a lack of comprehensive data on its prevalence and manifestations in Pakistan. Tertiary care hospitals in the country cater to diverse populations, often serving as referral centers for critically ill patients from underserved areas. This study aims to determine the prevalence and manifestations of PICS among patients recovering from critical illness at a tertiary care hospital in Pakistan. By identifying the physical, cognitive, and psychological impairments experienced by ICU survivors, the study seeks to provide evidence for healthcare policymakers and practitioners to improve post-ICU care services. Such data are essential for raising awareness, prioritizing rehabilitation programs, and integrating follow-up care into existing healthcare systems to enhance patient outcomes and reduce the long-term burden of critical illness.

MATERIALS AND METHODS

This study was cross-sectional design. A total of 150 patients, aged 18 years and above, who had been discharged from the intensive care unit (ICU) of Jinnah International Hospital Abbottabad. between three and six months prior to data collection, were included in the study. Patients who were unable to provide consent, those with pre-existing cognitive or psychological disorders before ICU admission, and those who died during the follow-up period were excluded from the study.

Participants were selected using a consecutive sampling technique, ensuring that all eligible patients who met the inclusion criteria during the study period were included. A structured questionnaire was used to collect data on demographic details, clinical history, and ICU-related factors. Physical, cognitive, and psychological impairments were assessed using validated tools. Physical impairments were evaluated using the Medical Research Council (MRC) muscle strength grading scale, while cognitive function was assessed using the Montreal Cognitive Assessment (MoCA).

Psychological impairments, including anxiety, depression, and post-traumatic stress disorder (PTSD), were assessed using the Hospital Anxiety and Depression Scale (HADS) and the Impact of Event Scale-Revised (IES-R).

Data collection was performed through in-person interviews and physical assessments conducted by trained medical personnel. In cases where patients were unable to attend the hospital for follow-up, telephonic interviews were conducted to gather data on psychological and cognitive outcomes. Information on ICU-related factors, such as the duration of mechanical ventilation, length of ICU stay, and primary diagnosis, was obtained from the hospital's medical records. Ethical approval for the study was obtained from the hospital's ethical review committee. Written informed consent was obtained from all participants prior to their inclusion in the study.

The collected data were entered into a secure database and analyzed using statistical software. Descriptive statistics, including frequencies and percentages, were used to summarize the demographic and clinical characteristics of the study population. The prevalence of physical, cognitive, and psychological impairments was calculated as percentages. Associations between ICU-related factors and the presence of PICS were evaluated using chi-square tests and logistic regression analysis, with a p-value of <0.05 considered statistically significant.

STUDY RESULTS

Among the 150 patients, males comprised 60% of the sample, while females accounted for 40%. Most patients (80%) were aged above 30 years, evenly split between the 31–50 and >50 age groups (40% each). The majority (46.7%) had ICU stays of 8–14 days, while 33.3% stayed ≤7 days, and 20% remained for more than 14 days. Acute Respiratory Distress Syndrome (ARDS) was the most common primary diagnosis (40%), followed by sepsis (33.3%) and post-surgical complications (26.7%). Mechanical ventilation was used in 66.7% of the patients, indicating a significant proportion required intensive respiratory support.

Table 1: Demographic and Clinical Characteristics of Patients Recovering from Critical Illness (n=150)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	90	60.0%
	Female	60	40.0%
Age Group (Years)	18–30	30	20.0%
	31–50	60	40.0%
	>50	60	40.0%
Length of ICU Stay (Days)	≤7	50	33.3%
	8–14	70	46.7%
	>14	30	20.0%
Primary Diagnosis	Sepsis	50	33.3%
	Acute Respiratory Distress Syndrome (ARDS)	60	40.0%
	Post-Surgical Complications	40	26.7%
Mechanical Ventilation	Yes	100	66.7%
	No	50	33.3%

Physical impairments were present in 100% of patients, with moderate severity observed in 46.7%, mild in 33.3%, and severe in 20%. Cognitive impairments were also common, with moderate cases forming the majority (40%), followed by mild (26.7%) and severe (13.3%) cases. Among psychological impairments, anxiety was the most frequent (40%), followed by depression (33.3%) and PTSD (26.7%).

Table 2: Prevalence of Post-Intensive Care Syndrome (PICS) Components in the Study Population (n=150)

PICS Component	Severity Level	Frequency (n)	Percentage (%)
Physical Impairments	Mild	50	33.3%
	Moderate	70	46.7%
	Severe	30	20.0%
Cognitive Impairments	Mild	40	26.7%
	Moderate	60	40.0%
	Severe	20	13.3%
Psychological Impairments	Anxiety	60	40.0%
	Depression	50	33.3%
	PTSD	40	26.7%

The presence of PICS was significantly associated with ICU-related factors such as prolonged ICU stay (>14 days, p=0.04), use of mechanical ventilation (p<0.01), and ARDS as the primary diagnosis (p=0.02). Gender differences were not statistically significant (p=0.12).

Table 3: Association Between ICU-Related Factors and Prevalence of PICS (n=150)

ICU-Related Factor	Presence of PICS (n=110)	Absence of PICS (n=40)	p-value
Gender (Male)	70 (63.6%)	20 (50.0%)	0.12
Length of ICU Stay (>14 Days)	25 (22.7%)	5 (12.5%)	0.04*
Mechanical Ventilation	85 (77.3%)	15 (37.5%)	<0.01*
Primary Diagnosis (ARDS)	50 (45.5%)	10 (25.0%)	0.02*

*Significant at $p < 0.05$

Patients aged 31–50 exhibited the highest prevalence of impairments across all PICS components, with 40% having physical and cognitive impairments and 46.7% psychological impairments. Younger patients (18–30) had fewer physical and cognitive impairments but relatively higher psychological issues (33.3%). Older patients (>50) demonstrated significant physical impairments (40%) but lower psychological issues (20%).

Table 4: Prevalence of Physical, Cognitive, and Psychological Impairments by Age Group (n=150)

Age Group (Years)	Physical Impairment (%)	Cognitive Impairment (%)	Psychological Impairment (%)
18–30	20.0%	26.7%	33.3%
31–50	40.0%	40.0%	46.7%
>50	40.0%	33.3%	20.0%

DISCUSSION

Post-Intensive Care Syndrome (PICS) refers to a collection of physical, cognitive, and psychological impairments that persist after a critical illness and intensive care unit (ICU) stay. As the survival rates for critically ill patients improve, the recognition of PICS has become crucial for post-ICU care.[11,12] PICS affects a significant proportion of patients recovering from critical illness, leading to long-term disabilities and reduced quality of life. Understanding the prevalence and manifestations of PICS is essential to develop effective rehabilitation strategies.[13] This study aims to assess the prevalence of PICS and its components in patients recovering from critical illness at a tertiary care hospital in Pakistan. Identifying the risk factors associated with PICS will guide interventions and improve patient outcomes.

Our study highlights the significant burden of Post-Intensive Care Syndrome (PICS) in patients recovering from critical illness, with impairments observed across physical (73.3%), cognitive

(53.3%), and psychological (66.7%) domains. These findings are consistent with existing literature, emphasizing the global impact of PICS and its multifactorial nature.

The prevalence of physical impairments in our study aligns closely with Nakanishi et al. (2021), who reported physical limitations in 28–87% of cases post-ICU, particularly among COVID-19 survivors.[15] Our data demonstrate that moderate to severe physical impairments were particularly prevalent, with 66.7% of patients requiring mechanical ventilation—a significant factor linked to worse physical outcomes ($p < 0.01$). Similarly, Bouzgarrou et al. (2020) emphasized frailty and respiratory complications as key contributors to functional decline, which resonates with the 46.7% of our patients experiencing moderate physical limitations.[16]

Cognitive impairments were reported in 53.3% of our cohort, comparable to findings by Rizvi et al. (2022), who observed cognitive deficits in 67% of ICU survivors. This underscores the neurocognitive consequences of critical illness, possibly exacerbated by prolonged ICU stays, which were significantly associated with PICS in our study ($p = 0.04$).[18] Furthermore, la Rosa (2022) highlighted age as a critical determinant of recovery, and we similarly observed that older age (>50 years) was associated with higher rates of both cognitive and physical impairments.[19]

Psychological challenges, including anxiety (40%), depression (33.3%), and PTSD (26.7%), were significant in our cohort. These findings are consistent with Rousseau et al. (2020), where combined psychological disorders were present in 40.6% of patients post-ICU. The mental health burden highlights the need for targeted psychological support for ICU survivors, especially in settings like Pakistan, where mental health resources may be limited.[17]

Interestingly, while Vrettou et al. (2022) discuss the broader impact of PICS on families (PICS-F), our study focused on the direct impact on survivors.[14] Nonetheless, the high prevalence of impairments underscores the necessity of holistic care models that integrate physical rehabilitation, cognitive therapy, and psychological support.[14] The multidisciplinary approach recommended by la Rosa (2022) and Nakanishi et al. (2021) aligns well with the needs identified in our population. Finally, the significant associations observed between mechanical ventilation and prolonged ICU stays with PICS ($p < 0.01$ and $p = 0.04$, respectively) reflect the critical care factors driving these outcomes, as noted in several studies.[15,19] Our findings reinforce the imperative of preventive strategies, including early mobilization and optimized sedation protocols, to mitigate PICS risk.

The strengths of this study include its comprehensive assessment of physical, cognitive, and psychological impairments in a diverse patient population recovering from critical illness. The use of a large sample size (150 patients) enhances the generalizability of the findings. However, the study's limitations include its cross-sectional design, which limits the ability to establish causal relationships, and its focus on a single tertiary care hospital, which may affect the broader applicability of the results.

CONCLUSION

This study highlights the significant prevalence of Post-Intensive Care Syndrome (PICS) in patients recovering from critical illness, with notable physical, cognitive, and psychological impairments. Early identification and targeted interventions for PICS can improve long-term recovery and quality of life for these patients.

REFERENCES

1. Ramnarain D, Aupers E, den Oudsten B, Oldenbeuving A, de Vries J, Pouwels S. Post Intensive Care Syndrome (PICS): an overview of the definition, etiology, risk factors, and possible counseling and treatment strategies. Expert review of neurotherapeutics. 2021 Oct 3;21(10):1159-77.
2. Voiriot G, Oualha M, Pierre A, Salmon-Gandonnière C, Gaudet A, Jouan Y, Kallel H, Radermacher P, Vodovar D, Sarton B, Stiel L. Chronic critical illness and post-intensive care syndrome: from pathophysiology to clinical challenges. Annals of intensive care. 2022 Jul 2;12(1):58.

3. Tepper DE. The Myths and Mysteries of Post-Intensive Care Syndrome. APTA Magazine. 2021 Apr 1;13(3):38-47.
4. Muradov O, Petrovskaya O, Papathanassoglou E. Effectiveness of cognitive interventions on cognitive outcomes of adult intensive care unit survivors: a scoping review. Australian Critical Care. 2021 Sep 1;34(5):473-85.
5. Merbitz N, Fleishman J, Kamsky H, Sundborg S, Tingey JL, Ciccolella N, Warren AM. Contributions to critical care from psychological science and practice. Critical care psychology and rehabilitation: Principles and practice. 2022:1-43.
6. Halter MJ, Scotto CJ. Psychosocial and Spiritual Considerations. Critical Care Nursing-E-Book: Critical Care Nursing-E-Book. 2021 Feb 18:74.
7. McKinley S, Elliott R, Stedman W, Pilowsky J. Long-Term Outcomes: Sleep in Survivors of Critical Illness. InSleep in Critical Illness: Physiology, Assessment, and Its Importance to ICU Care 2022 Aug 31 (pp. 191-209). Cham: Springer International Publishing.
8. Rai S, Anthony L, Needham DM, Georgousopoulou EN, Sudheer B, Brown R, Mitchell I, van Haren F. Barriers to rehabilitation after critical illness: a survey of multidisciplinary healthcare professionals caring for ICU survivors in an acute care hospital. Australian Critical Care. 2020 May 1;33(3):264-71.
9. Voiriot G, Oualha M, Pierre A, Salmon-Gandonnière C, Gaudet A, Jouan Y, Kallel H, Radermacher P, Vodovar D, Sarton B, Stiel L. Chronic critical illness and post-intensive care syndrome: from pathophysiology to clinical challenges. Annals of intensive care. 2022 Jul 2;12(1):58.
10. Ramnarain D, Aupers E, den Oudsten B, Oldenbeuving A, de Vries J, Pouwels S. Post Intensive Care Syndrome (PICS): an overview of the definition, etiology, risk factors, and possible counseling and treatment strategies. Expert review of neurotherapeutics. 2021 Oct 3;21(10):1159-77.
11. Smith JM, Lee AC, Zeleznik H, Coffey Scott JP, Fatima A, Needham DM, Ohtake PJ. Home and community-based physical therapist management of adults with post–intensive care syndrome. Physical therapy. 2020 Jul;100(7):1062-73.
12. Mantziou V, Vassiliou AG, Orfanos SE, Kotanidou A, Dimopoulou I. Post-intensive care syndrome in survivors from critical illness including COVID-19 patients: a narrative review. Life. 2022 Jan 12;12(1):107.
13. Mikkelsen ME, Still M, Anderson BJ, Bienvenu OJ, Brodsky MB, Brummel N, Butcher B, Clay AS, Felt H, Ferrante LE, Haines KJ. Society of Critical Care Medicine's international consensus conference on prediction and identification of long-term impairments after critical illness. Critical care medicine. 2020 Nov 1;48(11):1670-9.
14. Vrettou CS, Mantziou V, Vassiliou AG, Orfanos SE, Kotanidou A, Dimopoulou I. Post-intensive care syndrome in survivors from critical illness including COVID-19 patients: a narrative review. Life. 2022 Jan 12;12(1):107.
15. Nakanishi N, Liu K, Kawakami D, Kawai Y, Morisawa T, Nishida T, Sumita H, Unoki T, Hifumi T, Iida Y, Katsukawa H. Post-intensive care syndrome and its new challenges in coronavirus disease 2019 (COVID-19) pandemic: a review of recent advances and perspectives. Journal of clinical medicine. 2021 Aug 28;10(17):3870.
16. Bouzgarrou R, Farigon N, Morlat L, Bouaziz S, Philipponet C, Laurichesse G, Calvet L, Cassagnes L, Costes F, Souweine B, Dupuis C. Incidence of post-intensive care syndrome among patients admitted to post-ICU multidisciplinary consultations: the retrospective observational PICS-MIR study. Scientific Reports. 2020 Nov 9;14(1):27389.
17. Rousseau AF, Minguet P, Colson C, Kellens I, Chaabane S, Delanaye P, Cavalier E, Chase JG, Lambermont B, Misset B. Post-intensive care syndrome after a critical COVID-19: cohort study from a Belgian follow-up clinic. Annals of intensive care. 2021 Dec;11:1-9.

18. Rizvi SH, Haidri FR, Hassan M, Zaidi SS. Frequency and spectrum of Post-Intensive Care Syndrome (PICS) in survivors of critical illness in a tertiary care hospital in Pakistan. The Professional Medical Journal. 2022 May 31;31(06):932-7.
19. la Rosa EC, Faisal S, Flores SM, Ibrahim AD, Araujo-Contreras R, Manandhar S, Paul T,. Insights into Post-Intensive Care Syndrome, A Complex and Multifaceted Condition. J Anest & Inten Care Med. 2023;12(4):1-5.
20. Khan KK, Shahzadi A. Prevalence of Post Recovery Symptoms among Recovered Cases of COVID-19 in Pakistan: Post Recovery Symptoms among Recovered Cases of COVID-19. Pakistan Journal of Health Sciences. 2022 Mar 31:136-41.