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ORIGINAL ARTICLE

# Effect of mobility at ICU discharge on mortality and length of post-ICU stay: A retrospective analysis

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**KEYWORDS**
Critical care;
Early ambulation;
Patient outcome assessment;
Rehabilitation nursing

**Abstract**
*Background:* Admission to intensive care can be accompanied by significant adverse effects for patients, which last beyond their stay in the unit. Early mobilisation is part of a set of a bundle to minimise these effects and is now unanimously considered to be safe and beneficial. It is therefore important to understand how it is being implemented in practice and what its real benefits are.
*Aim/Objective:* To characterise mobility in the ICU and correlate the level of mobility at discharge from the ICU with the results of post-intensive care, namely: length of stay after intensive care and hospital mortality.
*Methods:* This was an observational, retrospective study carried out in the Intensive Care Department of a Local Health Unit located in the Portuguese countryside. A quantitative research methodology was used.
*Results:* Of the 244 patients included in the sample, 54.5% achieved orthostatism during the ICU stay and 36.5% achieved deambulation. The average length of stay between leaving the ICU and hospital discharge was $8.0 \pm 7.5$ days. Patients who remained at bed rest at discharge had longer hospital stays than patients who were ambulating ($p = 0.014$); and patients who performed activities in bed also had longer hospital stays than those who were orthostatic or ambulating ($p = 0.026$ and 0.002 respectively). Post-ICU mortality was 5.7%, and there was a strong correlation with mobility on discharge from the ICU ($p < 0.001$), with less mobile patients having a higher mortality rate than expected (odds ratio = 5.13).

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*Conclusions:* The mobility levels founded in this study are in line with international reality. Patients who achieve higher levels of mobility during their stay in intensive care have shorter hospital stays and lower mortality.


**PALABRAS CLAVE**
Cuidados críticos;
Ambulación precoz;
Evaluación del resultado de la atención al paciente;
Enfermería en rehabilitación

**Efecto de la movilidad al alta de la UCI sobre la mortalidad y la duración de la estancia pos-Terapia Intensiva: análisis retrospectivo**

**Resumen**
*Introducción:* El ingreso en cuidados intensivos puede asociarse a efectos adversos significativos para los pacientes, que persisten incluso después de su estancia en la unidad. La movilización precoz, que actualmente se considera segura y beneficiosa para la mayoría de los pacientes, es una de las medidas destinadas a minimizar estos efectos. Por eso, es importante conocer su aplicación práctica y sus beneficios reales.
*Objetivos:* Caracterizar la movilidad en la UCI y correlacionar el nivel de movilidad al alta con los resultados de los cuidados postintensivos, a saber: la duración de la estancia tras los cuidados intensivos y la mortalidad hospitalaria.
*Método:* Se trató de un estudio observacional, retrospectivo, realizado en la UCI de una Unidad Local de Salud localizada en el interior de Portugal. Se utilizó una metodología de investigación cuantitativa.
*Resultados:* De los 244 pacientes incluidos en la muestra, el 54,5% alcanzaron el ortostatismo durante su estancia en la UCI y el 36,5% llegaron a deambular. La duración media de la estancia entre el alta de la UCI y el alta hospitalaria fue de $8{,}0 \pm 7{,}5$ días. Los pacientes que permanecieron en reposo en el momento del alta tuvieron tiempos de hospitalización más largos que los pacientes que deambularon ($p = 0{,}014$); y los pacientes que estuvieron activos en la cama también tuvieron tiempos de hospitalización más largos que los pacientes ortostáticos o que deambularon ($p = 0{,}026$ y $0{,}002$, respectivamente). La mortalidad post-UCI fue del 5,7%, y hubo una fuerte correlación con la movilidad al alta de la UCI ($p < 0{,}001$). Los pacientes menos móviles presentaron una tasa de mortalidad más alta de lo esperado (*odds ratio* = 5,13).
*Conclusiones:* Los niveles de movilidad constatados en este estudio se ajustan a la realidad internacional. Los pacientes que alcanzan mayores niveles de movilidad durante su estancia en la UCI tienen estancias hospitalarias más cortas y una menor mortalidad.


## What is known?

Hospitalisation in intensive care can be accompanied by physical, psychological, cognitive and social disturbances, with a significant impact on quality of life after ICU discharge.

Early mobilisation is part of a set of interventions, the ABCDEF bundle, aimed at minimising the impact of critical illness.

Early mobilisation is a safe practice recommended by the main scientific organisations related to the care of the critically ill patient.

## What does it contribute?

This research shows the level of patient mobilisation in an intensive care unit in the interior of Portugal and shows that the level of mobilisation is related to important outcomes, such as length of post-ICU stay and post-ICU mortality.

## Implications of the study

This study emphasizes the importance of nurses trying to get these patients out of bed and achieving the maximum level of mobility appropriate to each patient's condition on a daily basis.

## Background

Hospitalisation in intensive care, which is often crucial to overcoming a critical health condition, is not completely harmless. A number of potential problems arise from a stay in intensive care, especially prolonged stays, some of which continue even after discharge. This problem led to the development of the concept of post-intensive care syndrome, which refers to the physical, psychological, cognitive and social disturbances resulting from a stay in intensive care and which persist beyond discharge.[1–3] This syndrome has a significant impact on patients' quality of life, tending to worsen its physical and psychological dimensions.[4,5] In addition, the risk of death is also higher, mainly due to the physical disability and cognitive impairment developed during the ICU stay.[6]

The ABCDEF bundle[7] is the benchmark for improving recovery from critical condition. It is based on the premises of monitoring pain and delirium, selecting the most appropriate analgesics and sedatives to control pain and providing a minimum level of sedation. Daily awakenings are recommended whenever possible, combined with training in spontaneous ventilation and early mobilisation. Family involvement and empowerment are also recommended.

In addition to the reference to early mobilisation made in the ABCDE bundle, mobilisation is increasingly recommended by consensus among experts and scientific societies.[8–11] The main indications for the safe start of mobilisation include cardiovascular, respiratory and neurological stability.[12] Despite some controversy in the past, mobilisation under infusion of vasoactive drugs, such as norepinephrine, can be carried out safely, as long as it meets the patient's condition and safety guidelines.[13,14] In this regard, expert consensus has been published, with the aim of the standardisation of mobilisation practices.[11,15,16]

The German Society for Anaesthesia and Intensive Care[9] adds that treatment should begin no later than 72 h after admission to intensive care, be carried out twice a day and last at least 20 min. The approach should be gradual and begin with passive mobilisation. The development of a specific algorithm for a unit or hospital is recommended.

Although the recommendations are clear, the results of analyses of mobilisation in critically ill patients worldwide are still below expectations.[17–19]

In Portugal, there are no known results of patient mobilisation and there is a particular organisation of rehabilitation care: there are specialist rehabilitation nurses working in the ICUs, which gives them an important role important role in general rehabilitation care and specifically in mobilisation.[20]

So we carried out this research to understand how we are mobilising our patients and what consequences mobilisation has on future outcomes, namely length of stay and post-care hospital mortality.

The objective of this study is: to characterise mobility in the ICU and correlate the level of mobility at discharge from the ICU with the results of post-intensive care, namely: length of stay after intensive care and hospital mortality.

## Methods

This was an observational, retrospective study carried out in the Intensive Care Department of a Local Health Unit located in the Portuguese countryside. A quantitative research methodology was used.

### Setting

The Intensive Care Medicine Service includes an adult Medical-Surgical Intensive Care Unit (a level III unit with 8 beds) and an adult Intermediate Care Unit (a level II unit with 4 beds). In the Intensive Care Unit, the nurse/patient ratio was 1:2 and in the Intermediate Care Unit it was 1:3. In none of the units is there a patient mobilisation protocol or regular support from a rehabilitation specialist. Occasionally, the Physical Medicine and Rehabilitation service was asked to accompany patients who showed greater physical weakness.

### Sample/participants

Patients admitted between 1st January and 31st December 2022 were included, regardless of diagnosis.

Patients who died during their stay in the ICU, those transferred to another institution, those readmitted to the ICU and patients without a mobility assessment at discharge were excluded.

### Data collection

The data relating to the ICU stay was collected from B.ICU-Care® (the ICU's computerised medical record) and the data relating to the post-ICU period was collected from SClinic® (the institutional computerised medical record).

### Research variables and measures

Mobility at discharge – Mobility was assessed using the ICU mobility scale developed by Hodgson,[21] translated and validated for several countries, including Portugal.[22] The scale classifies the level of mobility from 0 to 10, with 0 representing immobility in bed, or passive mobilisation, and 10 independent walking without assistance. In addition to this classification, with this scale it is also possible to classify 5 functional stages: Stage 1 (mobility scale score of 0), which corresponds to bed rest; Stage 2 (mobility scale scores of 1 and 2), which corresponds to activities in bed; Stage 3 (mobility scale score of 3), which corresponds to sitting at the bedside; Stage 4 (mobility scale score of 4–6), which ranges from orthostatism to stationary walking; and Stage 5 (mobility scale score of 7–10), which corresponds to ambulation.[23] Mobility at discharge refers to the maximum level of mobility seen in the last 24 h of ICU hospitalisation.

Length of post-intensive care stay – The period of time, expressed in days, from leaving the ICU until hospital discharge.

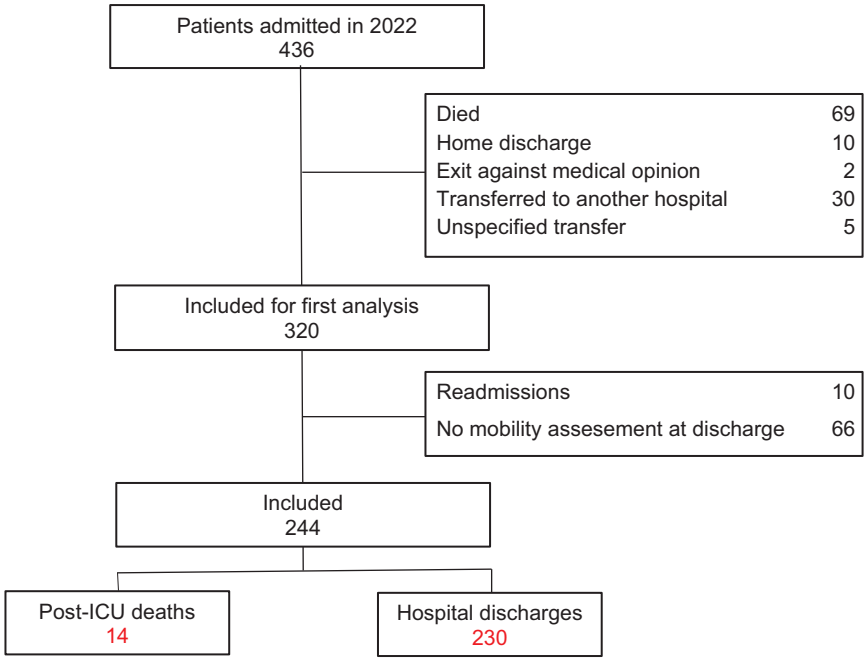


**Figure 1** Sampling flowchart.

Post-ICU mortality – Percentage of deaths that occurred between leaving the ICU and hospital discharge.

Time for standing – Number of days between admission and date of first orthostatism.[24]

## Ethical considerations

The research project was approved by the Ethics Committee of the local health centre (No. 9/16 of 2024). Informed consent was not required.

## Statistical analysis

The statistical analysis was carried out using the IBM Statistical Package for Social Science (SPSS) programme, version 27. The normality of the distribution of the variable 'length of post-ICU hospitalisation' was tested using the Kolmogorov–Smirnov test, which found that it did not respect the principles of normality ($p < 0.001$). The statistical tests carried out were based on non-parametric statistics, namely: the Kruskal–Wallis test for independent samples to assess the relationship between the level of mobility at ICU discharge and the time until hospital discharge; Pearson's Chi-squared test to assess a possible relationship between mobility on leaving the ICU and post-ICU hospital mortality. The magnitude of the effect was also calculated using Cramer's *V*, interpreted as suggested by Douglas.[25] A significance level of 0.05 was assumed.

## Results

The 436 admissions to the intensive care unit in 2022 were filtered taking into account the inclusion and exclusion criteria defined for this research (Fig. 1), resulting in a sample of 244 patients.

The sample, characterised in Table 1, was mainly composed of men (55.1%). Their ages ranged from 18 to 100, with the average being around 70 ($69.8 \pm 16.4$). The 70–89 age group accounted for more than 50 per cent of the sample (53.6%).

In most cases there is no reference to the level of previous dependence, but from the data available, cases of complete independence seem to predominate.

Admissions were mainly for medical reasons and the average severity was $36.1 \pm 15.2$ points for the SAPS II index and $17.9 \pm 9.0$ points for the APACHE II index.

Regarding the length of stay before admission to UCI, it ranged from 0 to 57.5 days, with an average of $1.2 \pm 4.0$ days and a median of 0.6 days.

In this sample, the ICU stay ranged from 0.7 to 36.1 days. The average length of stay in the ICU was around $5.6 \pm 5.1$ days, with a median of 4.4 days.

## Mobility in intensive care

When assessing mobility during ICU stays, we analysed time to orthostatism, maximum level of mobility and level of mobility at discharge.

With regard to orthostatism, it was only achieved by 133 individuals (54.5 per cent of the sample). In these cases, the goal was reached on average at $3.3 \pm 3.4$ days of ICU stay, with the median being 2 days. Table 2 shows the maximum level of mobility achieved during the ICU stay and mobility on ICU discharge, according to the functional mobility milestones proposed by Hodgson.[23] Comparing the results, at discharge there seems to be an increase in the frequency of the lowest levels of mobility and a consequent reduction in the highest levels. In 29.9 per cent of cases, mobility

**Table 1** Charaterization of the sample.

| | | *n = 244* |
|---|---|---|
| *Sex, n (%)* | | |
| Female | 109 | (44.5%) |
| Male | 135 | (55.1%) |
| *Age, mean (standard deviation)* | | |
| Years | 69.8 | (14.4) |
| *Previous dependence, n (%)* | | |
| Completely independent | 66 | (26.9%) |
| With some degree of dependence | 25 | (10.2%) |
| Unregistered | 154 | (62.9%) |
| *Type of admission, n (%)* | | |
| Elective surgery | 9 | (3.7%) |
| Urgent surgery | 26 | (10.6%) |
| Coronary | 32 | (13.1%) |
| Non-coronary medical | 176 | (71.8%) |
| Neurocritical | 1 | (0.4%) |
| *Severity at admission, score, mean (standard deviation)* | | |
| SAPS II | 36.1 | (15.2) |
| APACHE II | 17.9 | (8.0) |
| *Length of stay before admission to UCI, mean (standard deviation)* | | |
| Days | 1.2 | (4.0) |
| *Length of UCI stay, mean (standard deviation)* | | |
| Days | 5.6 | (5.1) |

APACHE, Acute Physiology and Chronic Health Evaluation II; SAPS, Simplified Acute Physiology Score II.

**Table 2** ICU mobility analysis.

| Mobility milestone (score on the UCI mobility scale) | Maximum | Discharge |
|---|---|---|
| Bed rest (score = 0) | 6.1% | 14.3% |
| Activities in bed (score between 1 and 2) | 35.2% | 40.2% |
| Sitting at the edge of the bed (score = 3) | 4.1% | 1.6% |
| Standing or stationary gait (score between 4 and 6) | 18.0% | 20.9% |
| Ambulation (score between 7 and 10) | 36.5% | 23.0% |

on the day of discharge was below the maximum already reached. Table 3 shows the characterisation of discharged patients in the different mobility milestones.

## Time to hospital discharge

The average length of stay between leaving the ICU and hospital discharge was 8.0 ± 7.5 days, with a median of 6.0 days. When analysing the time until hospital discharge according to the functional mobility milestone the patient reached in the 24 h prior to discharge from the ICU (Fig. 2), it can be seen that patients who achieved orthostatism or ambulation had shorter hospital stays.

The application of statistical tests (Kurskal–Wallis test) shows that the level of mobility at discharge, assessed using the 5 functional milestones proposed by Hodgson,[23] had a statistically significant effect on the time to hospital discharge ($p = 0.011$). According to the multiple comparisons of the means of the orders, there were significant differences in the length of post-ICU hospitalisation between:

- Patients with mobility level 1 (9.8 ± 9.4 days) and patients with mobility level 5 (6.1 ± 6.5 days), $p = 0.014$;
- Patients with mobility level 2 (9.0 ± 7.3 days) and patients with mobility level 4 (7.1 ± 7.5), $p = 0.026$, and 5 (6.1 ± 6.5 days), $p = 0.002$.

## Status at hospital discharge

There were 14 deaths between leaving the ICU and hospital discharge, which corresponds to 5.7% of patients discharged from the ICU. Analysing the type of hospital discharge according to the mobility milestone at discharge from the ICU shows that among patients who left the ICU at mobility milestone 1, mortality was 22.9%, at milestone 2 it was 4.1% and at milestone 4 it was 3.8%. There were no deaths in the other situations. Using Pearson's Chi-squared test, we can

**Table 3** characterisation of discharged patients in the different mobility milestones.

| | Mobility at discharge | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Stage 1 ($n=35$) | | Stage 2 ($n=97$) | | Stage 3 ($n=4$) | | Stage 4 ($n=52$) | | Stage 5 ($n=56$) | |
| *Age, mean (standard deviation)* | | | | | | | | | | |
| Years | 75.3 | (12.5) | 72.4 | (15.9) | 64.8 | (5.9) | 67.1 | (16.7) | 64.5 | (18.1) |
| *Severity at admission, score, mean (standard deviation)* | | | | | | | | | | |
| SAPS II | 44.0 | (19.1) | 36.9 | (13.4) | 36.5 | (11.8) | 37.2 | (15.4) | 28.9 | (12.7) |
| APACHE II | 20.7 | (10.1) | 16.0 | (7.3) | 15.5 | (5.1) | 17.5 | (8.1) | 14.3 | (7.6) |
| *Length of stay before admission to UCI, mean (standard deviation)* | | | | | | | | | | |
| Days | 1.3 | (1.9) | 1.3 | (2.1) | 2.8 | (3.7) | 1.8 | (8.0) | 0.4 | (0.7) |
| *Length of UCI stay, mean (standard deviation)* | | | | | | | | | | |
| Days | 6.8 | (6.7) | 5.4 | (5.6) | 8.3 | (8.7) | 6.2 | (4.7) | 4.2 | (2.6) |
| *Length of post- UCI stay, mean (standard deviation)* | | | | | | | | | | |
| Days | 9.8 | (9.4) | 9.0 | (7.3) | 8.5 | (5.4) | 7.1 | (7.5) | 6.1 | (6.5) |
| *Post-ICU mortality, n (%)* | | | | | | | | | | |
| Mortality | 8 | (22.9%) | 4.0 | (4.1%) | 0.0 | | 2.0 | (3.8%) | 0.0 | |

APACHE II, Acute Physiologic Assessment and Chronic Health Evaluation II; SAPS II, Simplified Acute Physiology Score II.

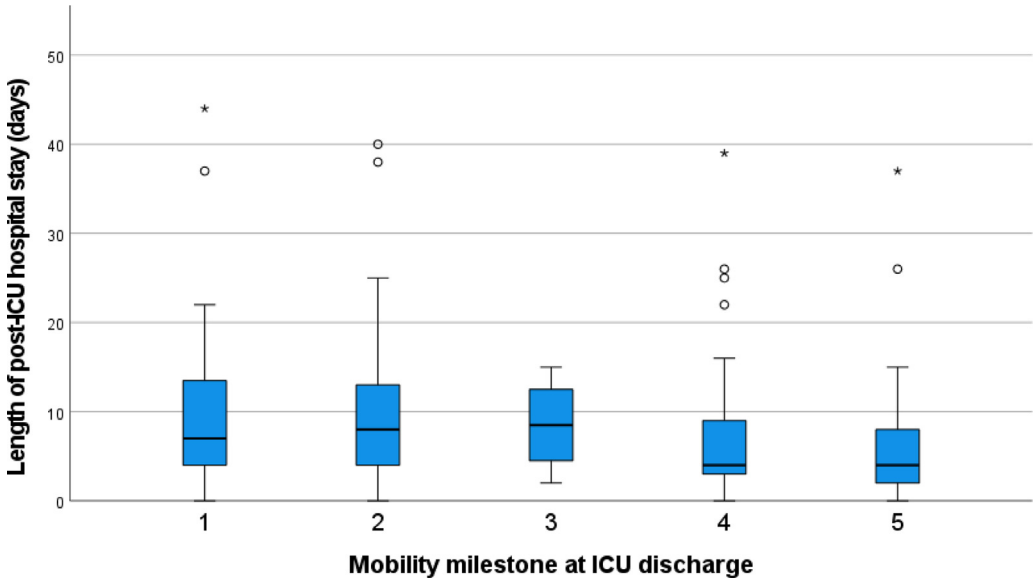


**Figure 2** Comparison of length of post-ICU hospitalisation according to mobility on ICU discharge.

conclude that hospital mortality is related to the level of mobility on leaving the ICU ($p<0.001$). Patients who were not out of bed in the 24 h prior to discharge had a significantly higher risk of in-hospital death than those who were mobilised out of bed (odds ratio = 5.13).

## Discussion

This study shows that levels of mobility on discharge from the ICU have an important relationship with the length of hospital stay after leaving these units. Patients who walked on the day of discharge had shorter hospital stays than those who remained on bed rest ($p=0.014$). Similarly, patients who achieved orthostatism or walking had shorter hospitalisation times than patients who only performed activities in bed ($p=0.026$ and 0.002 respectively). There was also a strong association between mobility on leaving the ICU and subsequent hospital mortality ($p<0.001$), with patients with lower levels of mobility having higher mortality rates than expected.

This study also revealed that orthostatism was achieved by 54.5 per cent of patients and, on average, this goal was achieved at $3.3 \pm 3.4$ days of ICU stay, with the median being 2 days. If we consider that the definition of early mobilisation refers to starting between 48[26] and 72 h,[9,27] we can consider that, about early mobilisation, the results found here are in line with current recommendations. It would be

interesting to assess whether patients who met the criteria for mobilisation were in fact mobilised according to their condition, but this was not the aim of this study.

As there are no national or international studies with a similar methodology, which would allow for a comparison of results, we report here the results of some cross-sectional mobility assessment studies. In Germany,[18] 24% of patients are mobilised out of bed. In Brazil,[17] 10% of patients achieved orthostasis on the day under analysis. Both situations included ventilated and non-ventilated patients, with ventilated patients showing much lower levels of mobility than non-ventilated patients, a fact that we believe is transversal to other units.

In a study carried out in Switzerland[28] with ventilated patients, reported that 33% of ventilated patients achieved three or more points on the mobility scale. As we have seen above, in this study the percentage of patients who reached this level of mobilisation was 58.6%, although this does not allow us to determine partial results for patients under invasive ventilation. Another study carried out in Spain,[29] involving patients ventilated for more than 48 h, reported that 29.4% of patients achieved a mobility value of 4 or more on the ICU mobility scale (mobility milestone 4 or 5). Once again, these figures are lower than those presented in this study (43.9 per cent) and also involve more seriously ill patients (APACHE II = 21 versus 19.7 points).

In theory, the day of transfer from the ICU should be the day when the patient has reached their maximum capacity, but the results tell us that in terms of mobility, this is not always the case, and in 29.9 per cent of cases, mobility on the day of discharge falls below the maximum already achieved. We think this may be due to limitations on discharges, which force patients to remain in the ICU while waiting for a place on the ward, and perhaps because nurses attach less importance to mobilisation than to other discharge preparation care.

Even though studies analysing the impact of early mobilisation programmes on the length of hospital stay have not produced consensual results,[30] this study shows an inverse relationship between the level of mobility at discharge and the length of post-ICU hospitalisation. In other words, higher levels of mobilisation are associated with shorter hospitalisation. There was a significant difference between functional mobility milestones 1 ($9.8 \pm 9.4$ days) and 5 ($6.1 \pm 6.5$ days) and also between milestone 2 ($9.0 \pm 7.3$ days) and 4 ($7.1 \pm 7.5$ days) or 5 ($6.1 \pm 6.5$ days). These results are in line with the finding that low to moderate levels of mobility, a score of 5 or less on the mobility scale (which corresponds to patients who transfer themselves to a chair at most), have longer post-ICU hospitalisation times ($15.0 \pm 16.0$ versus $7.3 \pm 6.0$).[31]

With regard to post-intensive care hospital mortality, this occurred in 5.7 per cent of cases, slightly lower than the 10 per cent reported by other papers.[32,33] It should be emphasised that in the other studies consulted, the severity assessed by the SAPS II index was higher ($42.8 \pm 19.4$ and $48.7 \pm 13.3$ versus $36.1 \pm 19.4$ in this study), and that this variable is itself related to an increase in post-ICU mortality.

As already mentioned, it was found that mortality occurred mainly in patients who left the ICU at functional mobility milestone 1 (bed rest), and the association between mobility on leaving the ICU and subsequent hospital mortality was statistically confirmed ($p < 0.001$). It was also found that patients who did not leave the bed in the 24 h prior to discharge had a significantly higher risk of in-hospital death than those who mobilised out of bed (odds ratio = 5.13). These results are in line with others who found that low to moderate levels of mobility (a score of 5 or less on the mobility scale, which corresponds to patients transferring to a chair at most) have a higher mortality rate (odds ratio = 2.51),[31] and associated high levels of mobility at ICU transfer with increased survival at 90 days (odds ratio = 1.38) and discharge home (odds ratio = 1.16).[34]

These findings reinforce the importance of early mobilisation as a tool for minimising the consequences of critical illness, as has been mentioned in the literature, particularly in the ABCDEF bundle.[7]

The merit of physiotherapists in this area is unquestionable, but in this article, due to the specific organisation of rehabilitation care in Portugal and the specificities of this ICU, we emphasise the role of the rehabilitation nurse. Nurses specialising in rehabilitation nursing, who are present in the majority of the Portuguese ICUs, in a situation unparalleled at international level, are an important part of rehabilitation care for people in critical situations.[20] Therefore, care for these patients should include, among other things, early mobilisation in accordance with the guidelines[8–10] and safety rules for mobilising these patients.[11,15,34]

The rehabilitation nurse can be an important piece in this complex puzzle of caring for people in critical condition. There are references in the literature to projects promoting mobility through the figure of the mobility champion,[35] a professional responsible for: coordinating the implementation of early mobilisation; and raising awareness among peers and family about the importance of early mobilisation. Nurses with specialised training in rehabilitation can play an important role in this type of initiative and be the mobility champion in their service.

However, as Hodgson[36] points out, optimising mobilisation involves a multimodal strategy. The author advocates an approach made up of 10 strategies:

Involve a multidisciplinary team, with the aforementioned mobility champions; integrate mobilisation into a structured quality improvement project; identify barriers and facilitators to mobilisation; promote multidisciplinary communication; take account of patients' preferences; adopt the safety criteria for mobilisation defined by expert consensus; integrate mobilisation care with the care bundles for pain, sedation, delirium, and sleep; obtain the necessary equipment to improve mobility and reduce the burden and risk of injury for carers; evaluate optimal timing, type, and dose of intervention; and, assess related outcomes. Although the apparent complexity of the process and the role of nurses in it remain unclear, as a recent literature review points out,[37] regardless of whether or not they have specialised training in rehabilitation or mobilisation, they must be seen as an asset to the process and join forces with other professionals so that the patient can benefit.

### Limitations

A limitation of this research is its retrospective design, which limited access only to what was recorded in the computerised file. This included an incomplete assessment of the level of previous dependence and possible comorbidities, which could cause some bias in the results, and also limited the possibility of analysing adverse events resulting from mobilisation. Many records were eliminated due to a lack of mobility assessment at the time of discharge or in the previous 24 h, which reduced the sample size and may have contributed to selection bias. It was found that the level of mobility on the day of discharge was often lower than the maximum level of mobility seen throughout the hospital stay, which, as well as potentially conditioning the results, shows that mobilisation is sometimes secondary to other procedures, particularly discharge preparation. Finally, since there is no randomisation or homogeneous groups, the results can be influenced by variables beyond the researcher's control and cannot be generalised.

## Conclusion(s)

Patients who reach higher levels of mobility during their stay in intensive care (mobility milestone 4 or 5) have shorter hospital stays than patients who remain in bed (mobility milestone 1 or 2). Similarly, we found that patients with lower levels of mobility a had higher than expected post-ICU mortality rates.

In view of these results, mobility should be integrated into the care plan for critically ill patients and nurses should be a reference in this area, particularly rehabilitation specialists.

Future studies, in addition to analysing mobility practices in other units, should look at compliance with mobilisation criteria and identify any barriers to mobilisation.

## Author contributions (CRediT statement)

RGM: Conceptualisation, Methodology, Data curation, Investigation, Project administration, Writing – original draft.

APN: Conceptualisation, Methodology, Supervision, Validation, Visualisation, Writing – review & editing.

MLN: Conceptualisation, Supervision, Validation, Visualisation, Writing – review & editing.

MCB: Conceptualisation, Supervision, Validation, Visualisation, Writing – review & editing.

## Ethical considerations

None of the authors have a conflict of interest to disclose.

## Funding

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## Conflict of interest

None of the authors have a conflict of interest to disclose.

## Data availability statement

The data that support the findings of this study are openly available in Mendeley Data at http://doi.org/10.17632/5924t7b3pm.1.

## References

1. Hiser SL, Fatima A, Ali M, Needham DM. Post-intensive care syndrome (PICS): recent updates. J Intensive Care. 2023;11:10.
2. Yuan C, Timmins F, Thompson DR. Post-intensive care syndrome: a concept analysis. Int J Nurs Stud. 2020; 114. 9 p.
3. Inoue S, Hatakeyama J, Kondo Y, Hifumi T, Sakuramoto H, Kawasaki T, et al. Post-intensive care syndrome: its pathophysiology, prevention, and future directions. Acute Med Surg. 2019;6:233–46.
4. Rai R, Singh R, Azim A, Agarwal A, Mishra P, Singh PK. Impact of critical illness on quality of life after intensive care unit discharge. Indian J Crit Care Med. 2020;24:299–306.
5. Kang J, Jeong YJ, Hong J. The effect of postintensive care syndrome on the quality of life of intensive care unit survivors: a secondary analysis. Aust Crit Care. 2021;34:246–53.
6. Yanagi N, Kamiya K, Hamazaki N, Matsuzawa R, Nozaki K, Ichikawa T, et al. Post-intensive care syndrome as a predictor of mortality in patients with critical illness: a cohort study. PLOS ONE. 2021;16:e0244564.
7. Marra A, Ely EW, Pandharipande PP, Patel MB. The ABCDEF bundle in critical care. Crit Care Clin. 2017;33:225–43.
8. Aquim EE, Bernardo WM, Buzzini RF, de Azeredo NSG, da Cunha LS, Damasceno MCP, et al. Brazilian guidelines for early mobilization in intensive care unit. Rev Bras Ter Intensiva. 2019;31:434–43.
9. Bein T, Bischoff M, Brückner U, Gebhardt K, Henzler D, Hermes C, et al. S2e guideline: positioning and early mobilisation in prophylaxis or therapy of pulmonary disorders: revision 2015: S2e guideline of the German Society of Anaesthesiology and Intensive Care Medicine (DGAI). Anaesthesist. 2015;64 Suppl. 1:1–26.
10. Gosselink R, Bott J, Johnson M, Dean E, Nava S, Norrenberg M, et al. Physiotherapy for adult patients with critical illness: recommendations of the European Respiratory Society and European Society of Intensive Care Medicine Task Force on Physiotherapy for Critically Ill Patients. Intensive Care Med. 2008;34:1188–99.
11. Hodgson CL, Stiller K, Needham DM, Tipping CJ, Harrold M, Baldwin CE, et al. Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. Crit Care. 2014;18:658.
12. Devlin JW, Skrobik Y, Gélinas C, Needham DM, Slooter AJC, Pandharipande PP, et al. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. Crit Care Med. 2018;46:e825–73.
13. Parada-Gereda HM, Pardo-Cocuy LF, Avendaño JM, Molano-Franco D, Masclans JR. Early mobilisation in patients with shock and receiving vasoactive drugs in the intensive care unit: a systematic review and meta-analysis of observational studies. Med Intensiva. 2025;49.
14. Lindholz M, Schellenberg CM, Grunow JJ, Kagerbauer S, Milnik A, Zickler D, et al. Mobilisation of critically ill patients receiving norepinephrine: a retrospective cohort study. Crit Care. 2022;26:1–10.
15. Raurell-Torredà M, Regaira-Martínez E, Planas-Pascual B, Ferrer-Roca R, Martí JD, Blazquez-Martínez E, et al. Early mobilisation algorithm for the critical patient. Expert recommendations. Enferm Intensiva. 2021;32:153–63.

16. Schaller SJ, Scheffenbichler FT, Bein T, Blobner M, Grunow JJ, Hamsen U, et al. Guideline on positioning and early mobilisation in the critically ill by an expert panel. Intensive Care Med. 2024;50:1211–27.
17. Fontela PC, Lisboa TC, Forgiarini-Júnior LA, Friedman G. Early mobilization practices of mechanically ventilated patients: a 1-day point-prevalence study in southern Brazil. Clinics. 2018;73:e241.
18. Nydahl P, Ruhl AP, Bartoszek G, Dubb R, Filipovic S, Flohr HJ, et al. Early mobilization of mechanically ventilated patients: a 1-day point-prevalence study in Germany. Crit Care Med. 2014;42:1178–86.
19. Perelló P, Gómez J, Mariné J, Cabas MT, Arasa A, Ramos Z, et al. Analysis of adherence to an early mobilization protocol in an intensive care unit: data collected prospectively over a period of three years by the clinical information system. Med Intensiva. 2023;47:203–11.
20. Mendes R, Nunes M. A importância da enfermagem de reabilitação nas unidades de cuidados intensivos portuguesas. Revista Portuguesa de Enfermagem de Reabilitação. 2018;1:8–13.
21. Hodgson C, Needham D, Haines K, Bailey M, Ward A, Harrold M, et al. Feasibility and inter-rater reliability of the ICU Mobility Scale. Heart Lung. 2014;43:19–24.
22. Mendes R, Nunes ML, Sousa MCBC, Gonçalves RBR, Fernandes PN, Gomes AJO. Validation of the ICU mobility scale for nursing use: Portuguese multicentric observational study. J Nurs Meas. 2021;29:80–93.
23. Hodgson CL, Bailey M, Bellomo R, Berney S, Buhr H, Denehy L, et al. A binational multicenter pilot feasibility randomized controlled trial of early goal-directed mobilization in the ICU. Crit Care Med. 2016;44:1145–52.
24. Silva V, Lima AS, Nadiele H, Pires-Neto R, Denehy L, Parry SM. Brazilian versions of the physical function icu test-scored and de morton mobility index: translation, cross-cultural adaptation, and clinimetric properties. J Bras Pneumol. 2020;46:e20180366.
25. Douglas M, De Sousa R, Nakano EY. Principais medidas de magnitude do efeito utilizadas na comparação de dois grupos [Monography on the Internet]. Brasilia (Brasil): Universidade de Brasilia; 2018, 111 p. Available from: https://bdm.unb.br/bitstream/10483/24752/1/2018_MarcosDouglasRodriguesDeSousa_tcc.pdf [cited 9.7.24].
26. Mah JW, Staff I, Fichandler D, Butler KL. Resource-efficient mobilization programs in the intensive care unit: who stands to win? Am J Surg. 2013;206:488–93.
27. Lai CC, Chou W, Chan KS, Cheng KC, Yuan KS, Chao CM, et al. Early mobilization reduces duration of mechanical ventilation and intensive care unit stay in patients with acute respiratory failure. Arch Phys Med Rehabil. 2017;98:931–9.
28. Sibilla A, Nydahl P, Greco N, Mungo G, Ott N, Unger I, et al. Mobilization of mechanically ventilated patients in Switzerland. J Intensive Care Med. 2020;35:55–62.
29. Raurell-Torredà M, Arias-Rivera S, Martí JD, Frade-Mera MJ, Zaragoza-García I, Gallart E, et al. Variables associated with mobility levels in critically ill patients: a cohort study. Nurs Crit Care. 2022;27:546–57.
30. Mendes R, Lopes P, Novo A, Nunes M, Castelo-Branco M. Effects of early progressive mobilisation programmes in critically ill patients: a systematic review of the literature. Revista Portuguesa de Enfermagem de Reabilitacão. 2023;6:e309.
31. Borges RC, de Lima VCBF, Papacidero C, Tobara M, Botana C, Longhi S, et al. ICU Mobility Scale as a predictor of hospital mortality in critically ill patients. Einstein. 2023;21 Suppl. 1.
32. Gonçalves-Pereira J, Oliveira A, Vieira T, Rodrigues AR, Pinto MJ, Pipa S, et al. Critically ill patient mortality by age: long-term follow-up (CIMbA-LT). Ann Intensive Care. 2023;13:7.
33. Meyer-Zehnder B, Erlanger TE, Pargger H. Mortality 7 years after prolonged treatment on a surgical intensive care unit. Swiss Med Wkly. 2022;152:w30144.
34. Berry A, Beattie K, Bennett J, Cross Y, Cushway S, Elliott D, et al. Physical activity and movement: a guideline for critically ill adults. Chatswood: Agency for Clinical Innovation; 2014. p. 30.
35. Bruce R. Integrating a mobility champion in the intensive care unit. Dimens Crit Care Nurs. 2018;37:201–9.
36. Hodgson CL, Schaller SJ, Nydahl P, Timenetsky KT, Needham DM. Ten strategies to optimize early mobilization and rehabilitation in intensive care. Crit Care. 2021;25:1–4.
37. Lee J, Kim Y, Lee HJ. Nurse-involved early mobilization in the intensive care unit: a systematic review and meta-analysis. Nurs Crit Care. 2025;30:e13278.