

# PROFILE AND LENGTH OF STAY OF INTENSIVE CARE PATIENTS ADMITTED TO THE POST-ANESTHESIA CARE UNIT

*Perfil e tempo de permanência de pacientes intensivos assistidos na recuperação pós-anestésica*

*Perfil y estancia de pacientes intensivos assistidos en la recuperación postanestésica*

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**ABSTRACT: Objective:** To identify the frequency, profile, and length of stay of intensive care patients admitted to the post-anesthesia care unit (PACU). **Method:** This is a retrospective cross-sectional study based on PACU admission records of a public hospital in Rio Grande do Sul, Southern Brazil, between July 2012 and June 2017. **Results:** In the study period, 22,333 patients were admitted to the PACU; 717 (3.2%) of them were intensive care patients due to the unavailability of beds in the intensive care unit. Among them, 67.6% were women, 61.2% were adults, and 61.5% were individuals submitted to neurosurgery. The mean length of stay in the unit was 10.7 hours, and 4.1% of patients died. **Conclusion:** The stay of intensive care patients in the PACU requires adapting the physical and operational structure of the unit, particularly in aspects related to the care team, including the number of personnel and the technical training necessary to ensure the quality of care.

**KEYWORDS:** Recovery room. Anesthesia recovery period. Postanesthesia nursing. Perioperative nursing. Critical care. **RESUMO: Objetivo:** Identificar a frequência, o perfil e o tempo de permanência de pacientes intensivos admitidos na sala de recuperação pós-anestésica (SRPA). **Método:** Estudo transversal e retrospectivo, realizado com base em registros de admissões na SRPA de um hospital público no Rio Grande do Sul, entre julho de 2012 e julho de 2017. **Resultados:** No período estudado, admitiram-se no setor 22.333 pacientes, sendo 717 (3,2%) pacientes intensivos por indisponibilidade de leito na unidade de terapia intensiva. Destes, 67,6% eram do sexo feminino, 61,2% em idade adulta, submetidos à neurocirurgia (61,5%). O tempo de permanência médio no setor foi de 10,7 horas, e 4,1% dos pacientes foram a óbito. **Conclusão:** A permanência de pacientes intensivos na SRPA requer adequação do setor em sua estrutura física e operacional, especialmente no que diz respeito à equipe assistencial tanto em quantidade de pessoal quanto em capacitação técnica necessária para assegurar uma assistência de qualidade.

**Palavras-chave:** Sala de recuperação. Período de recuperação da anestesia. Enfermagem em pós-anestésico. Enfermagem perioperatória. Cuidados críticos.

**RESUMEN: Objetivo:** Identificar la frecuencia, perfil y tiempo de estancia de los pacientes de cuidados intensivos ingresados en la Sala de Recuperación Posanestésica (SRPA). **Método:** Estudio transversal y retrospectivo, realizado a partir de los registros de ingreso en la UCPA de un hospital público de Rio Grande do Sul, entre julio de 2012 y julio de 2017. **Resultados:** En el período estudiado ingresaron al sector 22.333 pacientes, 717 (3,2%) pacientes de cuidados intensivos por indisponibilidad de camas en la Unidad de Cuidados Intensivos. De estos, el 67,6% eran mujeres, el 61,2% adultos, sometidos a neurocirugía (61,5%). La estancia media en el sector fue de 10,7 horas y falleció el 4,1% de los pacientes. **Conclusión:** La permanencia de los pacientes de cuidados intensivos en la SRPA requiere la adecuación del sector en su estructura física y operativa, especialmente en lo que se refiere al equipo asistencial, tanto en el número de personal como en la formación técnica necesaria para asegurar una atención de calidad.

**Palabras clave:** Sala de recuperación. Periodo de recuperación de la anestesia. Enfermería posanestésica. Enfermería perioperatoria. Cuidados críticos.

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## INTRODUCTION

The post-anesthesia care unit (PACU) is designed to provide immediate care to patients under the effect of different types of anesthesia and surgery. To this end, the nursing team should be adequate and trained to provide this service, as sometimes highly complex care is necessary<sup>1,2</sup>.

In this unit, the nurse ensures care until the patient has their vital signs stable, returns to full awareness, and recovers their protective reflexes, taking into account the surgical procedure and the type of anesthesia administered, in addition to inherent individual risks related to their clinical history<sup>3</sup>. However, the PACU has been currently used for intensive care patients after surgical procedures as a backup of the intensive care unit (ICU), since the high demand of critical patients is inversely proportional to the number of intensive care beds available. Other hospital departments have assumed this care while the patient waits for an ICU bed, causing them to stay hours or even days in the unit<sup>4</sup>.

PACU primarily provides assistance to patients requiring intermediate and semi-intensive care. Therefore, admitting and assisting critical patients demands a deeper reflection on how to ensure care with a clinical approach, considering not only the recovery from effects of the anesthesia-surgical procedure but also integrated care so as to provide a service suitable to the complexity of these patients<sup>5</sup>.

Bearing in mind that nursing care must be preceded by planning, knowing the profile and length of stay of intensive care patients in the PACU is paramount to understand its supply and demand and prepare the unit for both the physical and material resources and the workforce required, including ICU specialist nurses in its staff to ensure the quality of care for patients while they wait for an ICU bed<sup>4,6</sup>.

## OBJECTIVE

To identify the frequency, profile, and length of stay of intensive care patients admitted to the PACU.

## METHOD

This is a retrospective cross-sectional study based on data collected in December 2017, whose information source was the records of intensive care patients admitted to the PACU

in a five-year period (July 2012 to June 2017). Data were collected in a 264-bed public hospital, a reference in the care for multiple-trauma patients in Rio Grande do Sul, Southern Brazil.

The hospital unit has six operating rooms (OR) in the main surgical center (SC) and one OR in the outpatient SC. On average, 525 surgeries are performed per month in the specialties of neurosurgery, traumatology, plastic surgery, vascular surgery, and oral and maxillofacial surgery. The PACU has 12 active beds and receives non-critical patients in the immediate postoperative (IPO) period, as well as intensive care patients who are waiting for an ICU bed.

The study variables analyzed were sex, age, surgical specialty, length of stay in the unit, and destination. Data were organized in an Excel spreadsheet and assessed by descriptive statistics and analysis of variance (ANOVA), considering  $p < 0.05$  as statistically significant.

Data were collected after approval from the Research Ethics Committee (REC) of the facility under study, under CAAE 78636917.8.0000.553, via Plataforma Brasil, according to recommendations of the National Health Council Resolution No. 466 from December 12, 2012<sup>7</sup>.

## RESULTS

From July 2012 to June 2017, 22,333 patients were admitted to the PACU. Among them, 717 (3.2%) were intensive care patients who should have been admitted to the ICU immediately after the anesthesia-surgical procedure but who were admitted to the PACU due to the unavailability of ICU beds.

Table 1 presents the total number of patients and intensive care patients admitted to the PACU, according to month/year of admission, and Figure 1 shows the percentage of admissions of intensive care patients to the unit along the years.

Still on frequency, 2016 had the highest number of admissions (14.7 patients/month), and October presented the highest incidence of admissions over the years (17.8% of patients/month/year).

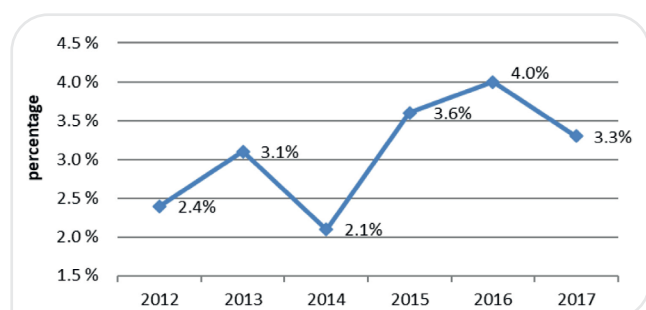
Table 2 reveals the main data regarding the profile of critical patients admitted to the PACU.

The length of stay of intensive care patients in PACU beds ranged from 30 minutes to 237 hours, with a mean stay of 10.7 hours. Table 3 shows the mean length of stay per month/year. We found an increasing trend in the mean

**Table 1.** Total patients and intensive care patients admitted to the post-anesthesia care unit per month/year (2012–2017).

Month	2012		2013		2014		2015		2016		2017	
	TA	TI	TA	TI	TA	TI	TA	TI	TA	TI	TA	TI
Jan.	-	-	397	9	353	5	369	5	349	13	398	11
Feb.	-	-	373	11	315	3	311	8	340	9	314	15
Mar.	-	-	381	16	303	5	425	8	424	22	420	24
Apr.	-	-	426	7	303	5	378	13	352	20	303	9
May	-	-	470	18	358	5	381	15	388	14	418	8
Jun.	-	-	359	14	370	8	371	18	386	16	389	9
Jul.	377	03	381	24	403	6	401	23	334	9	-	-
Aug.	418	09	399	13	356	11	394	10	404	8	-	-
Sep.	354	12	353	4	315	11	396	18	335	17	-	-
Oct.	413	13	374	18	362	13	375	18	345	27	-	-
Nov.	380	12	360	8	320	7	386	24	350	13	-	-
Dec.	380	9	369	6	386	10	398	9	391	9	-	-
Total	2,322	58	4,642	148	4,144	89	4,585	169	4,398	177	2,242	76

TA: total admissions; TI: total of intensive care patients.



**Figure 1.** Percentage of admissions of intensive care patients to the post-anesthesia care unit per year (2012–2017).

length of stay during the study period, with no significant difference ( $p=0.510$ ).

Concerning the patients' destination, 687 (95.8%) were transferred to the ICU when a bed became available, while 30 (4.1%) patients died in the PACU.

## DISCUSSION

The deficit in ICU beds is considered a reality in the Brazilian scenario, corroborating the findings of this research, which presents a significant number of admissions of critically ill

**Table 2.** Characterization of the sample of intensive care patients in the post-anesthesia care unit, according to sex, age, and surgical specialty (n=717).

Variable	N	%
Sex		
Female	485	67.6
Male	232	32.4
Age group (years)		
4–11 (children)	6	0.8
12–18 (adolescents)	40	5.6
19–59 (adults)	439	61.2
60–97 (older adults)	232	32.4
Surgical specialty		
Neurosurgery	441	61.5
General surgery	168	23.4
Orthopedic surgery	65	9.1
Vascular surgery	21	2.9
Plastic surgery	11	1.5
Oral and maxillofacial	9	1.3
Major burn surgery	2	0.3
Total	717	100.0

**Table 3.** Mean length of stay (in hours) of intensive care patients in the post-anesthesia care unit per year (2012–2017).

Month	2012	2013	2014	2015	2016	2017
January	-	11.4	5.8	11.8	8.3	11.4
February	-	15.8	8.6	6.7	5.4	17.1
March	-	13.0	11.4	7.7	18.9	15.0
April	-	8.2	15.6	16.8	11.2	14.6
May	-	10.5	6.0	9.0	14.2	21.2
June	-	10.0	5.6	14.1	18.6	8.3
July	7.6	13.2	20.8	15.0	14.3	-
August	10.2	15.0	8.1	15.6	5.1	-
September	11.0	7.5	27.5	12.2	17.5	-
October	11.7	8.2	21.3	18.1	24.5	-
November	8.2	14.6	15.5	12.0	10.6	-
December	10.0	8.8	5.6	13.2	16.7	-
Annual mean	9.8	11.4	12.7	12.7	13.8	14.6
Mean length of stay: 10.7 hours						

patients to the PACU, with similar averages over the months and years studied, evidencing that this is not an isolated event<sup>5,8</sup>.

Regarding the patient profile, this study showed a prevalence of biologically female individuals, differing from national data, which indicate that the male sex is more affected by external causes and more prone to intensive care hospitalization<sup>9-12</sup>. According to data from the Mortality Information System (*Sistema de Informação de Mortalidade – SIM*) and demographic data from the Technology Department of the public health system (*Departamento de Informática do Sistema Único de Saúde – Datasus*), women are more vulnerable to deaths caused by traffic accidents and violence<sup>13</sup>.

As to the age group of patients, most of them were adults, a life stage with a higher incidence of accidents and situations related to urban violence, attributed in special to the aggressive and risk behavior of men, who are almost five times more likely to die early, that is, for each woman, approximately five men die in Brazil<sup>13</sup>.

Older adults comprise the second critical group most admitted to the PACU due to the aging process associated with chronic degenerative diseases and to domestic accidents, such as falls. The care given to the older surgical patients should be different from that provided to other age groups, especially when it comes to issues related to changes caused by the aging process and by the presence of associated diseases that may lead to functional impairment, increasing the vulnerability to postoperative complications<sup>14</sup>.

Neurosurgery was the specialty responsible for most hospitalizations of intensive care patients in the PACU in this study. This finding is justified by the fact that the neurosurgery service of the facility investigated is considered a state reference in high complexity procedures, with 45% of the patients admitted to the hospital. In addition to performing an average of 900 surgeries per year, it has the differential of maintaining a relationship with other specialized services, providing comprehensive care that involves 25 neurosurgeons and other professionals of the multidisciplinary team<sup>15</sup>.

The length of stay of intensive care patients showed great variation, corroborating the findings of another study conducted in the state of São Paulo, which presented an even higher variation: between 3 and 384 hours, with a mean stay of 41.4 hours<sup>2</sup>, a value also superior to the mean stay identified in this research and much higher than the mean length of stay of patients in the IPO period or who require non-intensive care, which is only 1.8 hours<sup>8</sup>.

When comparing care with the length of stay in hours, we found that intensive care patients have a significantly higher mean length of stay and require more complex care than patients in other categories<sup>4</sup>.

Thus, the admission and stay of severe patients in the PACU negatively affect the team, since the intensive care patient, in addition to presenting functional instability of organic systems, leading to situations of imminent

emergency and constant attention that are common for patients in the IPO period, also requires multiple invasive procedures<sup>16</sup>, producing a high level of stress in the team that works in the PACU<sup>2,4,8</sup>.

Critical patients in backup beds need procedures that are not part of the PACU routine, which is characterized by low- or moderate-complexity care. These procedures include the administration of enteral diets and drugs by infusion pump, bed bath, prevention of pressure ulcers, and change in position, which are carried out by a team of nursing technicians, while the nurse provides highly complex care, such as catheterization, placement of the arterial line, large dressings for surgical wounds, among others<sup>2,8</sup>.

In this scenario, personnel distribution must transcend merely mathematical issues and be planned from a qualitative perspective. Thus, we stress the need for a flexible systematization of care<sup>17</sup>, mainly because the presence of critical patients is not constant, and the length of stay varies, preventing the nurse from creating a fixed scale. We also emphasize the importance of having a nurse in the PACU at all times, which is not always a reality in many Brazilian facilities<sup>8</sup>.

In this regard, the Brazilian Association of Surgical Center, Anesthesia Recovery, and Sterile Processing Department Nurses (*Associação Brasileira de Enfermeiros em Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização – SOBECC*) recommends that PACU have one nursing technician for every three patients and an attending nurse for every eight beds of patients not dependent on respirators or three to four critical patients<sup>18</sup>.

When critical patients stay in the PACU, they directly impact the unit routine, demanding an appropriate number of workers available for care, as well as the technical qualification of such professionals. Some nursing professionals have reported feeling unprepared to assist critical patients and required adequate training for the work and the handling of specific equipment. In addition, PACU might not have an adequate physical environment to receive patients in isolation, for instance, and/or lack ICU-specific material resources and equipment, impacting the quality of care provided<sup>8</sup>.

We can also mention the lack of or delay in care by members of the multidisciplinary team, such as occupational therapists, physical therapists, and an intensivist monitoring the patient 24h/day. The difficulties may be aggravated by the presence of relatives during visiting hours, increasing the circulation of people in the unit<sup>8</sup>.

Concerning the destination of severe patients, the vast majority was transferred to the ICU, but part of them died

in the PACU, an atypical situation in the daily routine of the unit. Death in the PACU has two negative aspects: first, the emotional shock in workers engaged in saving lives, which can produce feelings of failure<sup>19,20</sup>, and second, technical and operational issues. Procedures such as preparing the body, filling forms, transferring the body to a proper location, and contacting the family to communicate the death demand staff time, leaving other patients in the IPO period unassisted<sup>4</sup>.

This study presents limitations since it was developed in a specific region of Brazil. Therefore, we emphasize the importance of new studies on the theme in different regions of the country, where the use of the PACU as an ICU backup has become routine, in order to know the strategies used by these facilities to adapt the environment, the material and technological resources, and the nursing and multidisciplinary team for the safe and humanized care for critical patients.

## CONCLUSION

In this study, 717 critical patients were admitted to the PACU over a 5-year period, with greater frequency in October of each year and in 2016 as a whole. The patients were mostly women, adults, and individuals submitted to neurosurgery. The mean length of stay of patients in the PACU was 10.7 hours.

These results indicate the PACU as an alternative to admit and assist intensive care patients after surgical procedures when ICU beds are unavailable, even though the unit is not primarily designed for this type of care.

The care for critical patients differs from the routine experienced in the PACU, which focuses on postoperative complications with high bed turnover. The unit also lacks structural conditions to ensure the privacy of patients in situations such as death.

This type of care, albeit sporadic, requires adjusting the physical environment of the unit, the amount and proper operation of materials and equipment, and the sufficient number of nursing professionals, as well as their adequate technical qualification, in addition to the constant presence of a nurse and an intensivist to provide support in any situation.

The long length of stay of intensive care patients is a constant reality in the facility investigated and has become common in other Brazilian contexts, showing that these institutions need to reorganize their care and administration without overworking the professionals involved in the service or harming the patients under their care.

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