

# Prolonged-Stay Patients in the PACU: A Review of the Literature

*Sharifa Bashir Lalani, MScN, RN, RM, Fauziya Ali, PhD, MEd, BScN, RN, RM,  
Zeenatkhanu Kanji, PhD, MSc, BScN, RN, RM*

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*The postanesthesia care unit (PACU) provides general to intensive care to immediate postsurgical patients. Patients with extensive surgeries are often kept in PACU until their condition is stabilized before shifting them to their designated wards, creating more demands on PACU nurses. A prolonged patient stay in a PACU is a crucial issue as it creates bottlenecks that may result in the slowing down of the surgical schedule, leading to dissatisfaction for surgeons, nurses, patients, and their families. A literature search was undertaken to understand the definition and causes of prolonged PACU patient stay and the impact of these prolonged stays on PACU function and flow. Limited studies discuss the impact of prolonged PACU stays on patients, families, and PACU nurses. Future research is required to explore the experiences of PACU nurses related to prolonged-stay patients.*

**Keywords:** *length of stay, literature review, postanesthesia care unit (PACU).*

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**THE PACU, ESTABLISHED** in the beginning of the 18th century, was originally known as the recovery room, but has evolved over the years into what is now referred to as a critical care unit for patients recovering from anesthesia and surgery.<sup>1</sup> In 1863, Florence Nightingale identified a room in the theater vicinity in which patients remained until they recovered after anesthesia and surgery. With rapid changes in health care across the world, the scope of the PACU in providing immediate postoperative care has been expanding,

and it is now used as an intensive care and recovery unit for surgical and intensive care unit (ICU) overflow patients.<sup>2</sup> This arrangement demands extra PACU beds and nursing care. In addition to this, the PACU may serve as an overnight intermediate care unit in some organizations. The purpose of this literature review was to critically examine the contributing factors prolonging the patient's stay in the PACU and explore the impact of prolonged-stay patients on other postanesthesia patients, their families, and PACU nurses. Additionally, gaps in the scientific literature were identified.

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*Sharifa Bashir Lalani, MScN, RN, RM, is a Senior Instructor at The Aga Khan University School of Nursing and Midwifery; Fauziya Ali, PhD, MEd, BScN, RN, RM, is the Director of MScN Program at The Aga Khan University School of Nursing and Midwifery; and Zeenatkhanu Kanji, PhD, MSc, BScN, RN, RM, is the Director of International Programs at The Aga Khan University School of Nursing and Midwifery, Karachi, Pakistan.*

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*Address correspondence to Sharifa Bashir Lalani, The Aga Khan University School of Nursing and Midwifery, Stadium Road, P.O. Box 3500, Karachi 74800, Pakistan; e-mail address: [sbarifa.lalani@aku.edu](mailto:sbarifa.lalani@aku.edu).*

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## Search History

A comprehensive search was conducted using the Cumulative Index to Nursing and Allied Health Literature and Science Direct databases for both research and nonresearch articles. The literature review and critical evidence appraisal are based on research topics relevant to the care of patients with prolonged stays in PACU, which includes definition, causes for prolonged stay in a PACU, and impact of prolonged stay on other postanesthesia patients, their families, and PACU nurses.

## Inclusion Criteria

Articles included in the review met the following criteria:

- Written in English language within the last 10 years.
- Literature involving adult and children.
- Research and nonresearch peer-reviewed articles.

Each article was reviewed for quality of study design and relevance of findings. Additionally, references of all the articles were reviewed.

## Defining Prolonged-Stay Patients

The definition of prolonged-stay patients in a PACU varies. According to Lau et al,<sup>3</sup> the duration of stay in a PACU is defined as prolonged when it lasts for more than 2 hours. However, the PACU may also be used as an overflow area for the ICU and critical care unit.<sup>4,5</sup>

Patients who are kept as overflow patients in the PACU are often referred to as boarders, extended stay or ICU overflow patients.<sup>6</sup> The American Society of PeriAnesthesia Nurses<sup>7</sup> developed a Joint Position Statement in conjunction with the American Association of Critical-Care Nurses, the American Society of Anesthesiologists, the Anesthesia Care Team Committee, and the Committee on Critical Care Medicine and Trauma Medicine. This statement notes that the primary responsibility of the PACU is to provide care to postanesthesia patients and to maintain the flow of the operating room (OR) schedule. In this endeavor, it is necessary to ensure that appropriate PACU staffing requirements are met to maintain safe and competent nursing care of postanesthesia patients.<sup>8</sup> When the patients' stay becomes prolonged in the PACU, it interferes with the primary responsibility of the PACU nurse, which should be focused on immediate postanesthesia patients.

Because of a shortage of inpatient beds in many hospitals, postanesthesia patients may have to wait in the PACU for critical care or unit beds,<sup>9</sup> increasing the demand on PACU nurses. As a result, the flow of patients from the PACU is stopped, and the unit cannot receive patients from the OR. PACU can be a high-volume area where postanesthesia patients require frequent assessment,

interventions requiring hemodynamic monitoring, and postoperative care to include the management of pain, nausea, vomiting, and bleeding.<sup>10</sup> PACU patients are vulnerable, and hemodynamic changes can occur rapidly. In PACU, patients' circumstances are highly unpredictable, and no amount of preplanning can anticipate the situation.<sup>5</sup> Additionally, there are a number of other factors that can prolong PACU stay such as unavailability of transporters or critical care beds.

## Causes of Prolonged Stay

Mather et al<sup>11</sup> performed a quality project in Hartford hospital in 2007 focusing on PACU delays. The major reasons for delay included unavailability of a porter for transportation (52.7%), unavailability of PACU nurses owing to being busy attending other patients (41.1%), unavailability of an anesthesiologist for assessment predischARGE (1.2%), unavailability of beds (2.6%), and OR hold (2.4%). OR holds were defined as when a patient cannot leave the OR because of a lack of PACU or ICU beds.<sup>12</sup> The additional time spent by some postoperative patients in the PACU is unnecessary and should be decreased. Samad et al<sup>13</sup> performed a prospective observational study in a tertiary care hospital in Karachi, Pakistan, collecting data for 20 months. They observed that of 13,644 patients visiting the PACU, 1,114 (8.1%) stayed in the PACU for more than 2 hours. Of these, 578 (51.8%) patients needed further postoperative monitoring because of medical condition, extent of surgery, or some intraoperative complication; 264 cases (23.7%) experienced prolonged stay because of unavailability of special care beds; 68 (6.1%) patients stayed for pain management; 61 (5.7%) because of delayed emergence from the regional block; 61 (5.4%) for unplanned postoperative ventilation; and 17 (1.5%) of nonsurgical patients were ventilated in the PACU because of unavailability of critical care beds. The percentage with a prolonged stay ranged from 6.4% to 10% monthly.

Saastamoinen et al<sup>14</sup> conducted a study for 1 year in the PACU of a tertiary care hospital in Finland and discovered that 436 (4.6%) patients arrived from other parts of the hospital rather than from the OR. The patients came for the insertion of central venous catheters, epidural blood patches, pain therapy, observation after radiology

procedures, and mobilization of a joint. Fifty patients (11.5%) stayed overnight in the PACU, and 218 patients (50%) received medications such as opioids. These patients required laboratory tests and chest X-rays. The patients developed numerous problems such as nausea, vomiting, pain, dyspnea, chest pain, and agitation, which prolonged their stay in the PACU. One hundred thirty-two patients (30%) were admitted to the PACU during evening and nighttime hours.

### Impact of Prolonged-Stay Patients in the PACU

Weissman<sup>15</sup> stressed that when timely discharges and transfers do not take place, congestion develops and results in bottlenecks at various stages along the perioperative continuum. To ensure efficient patient care, there should be collaboration between the nurses of the OR, PACU, and units for transferring patients from one place to the other. When people work in their silos and think only about their units, however, there is a tendency to develop the “fiefdom” syndrome, where each component of the system is working independently and is, therefore, nonproductive in the delivery of efficient patient care. Blockages can occur at any part in the system: at the OR, PACU, or at monitored or regular units. To avoid obstruction, patient care management should work as one holistic system. In hospitals, the patient flow is interdependent, and a bottleneck at any point in the system must be considered for its potential impact on the perioperative care system as a whole.

Kiekkas et al<sup>16</sup> used the Project Research in Nursing (PRN), which is a time-based scale, including categories like hygiene and feeding as well as others. They found out that the mean PRN score was much higher in ICU patients who were admitted to the PACU as compared to standard post-anesthesia patients. In addition, total care time and nursing personnel needs were evident in the presence of an ICU overflow patient during all shifts. Kiekkas et al<sup>17</sup> studied PACU nurses of the General University Hospital of Patras, Greece, and recorded activities on hourly check sheets for a month. Results showed variation in the use of time on different shifts. For example, direct clinical care, documentation, and communication with other persons were highest during morning shift. On the other hand, communication with

patients, clerical, and nonnursing task increased during evening shift. The direct clinical time increased from 29.8% to 49.8% when nurse-patient ratio was inappropriate. PACU nursing experience showed some variations in the use of time. Time spent on patient communication and direct clinical care was higher among less experienced nurses and decreased as the years of experience increased. One of the findings revealed that when a backlog developed and patient flow became static, nurses tended to spend more time in communication and indirect nursing activities. Such delay may result in altered surgical schedules and in dissatisfaction for surgeons, nursing staff, patients, and their families.<sup>18</sup>

A study by Schweizer et al<sup>19</sup> revealed that increased availability of PACU beds led to reduced utilization of ICU resources, leading to important cost savings and better allocation of human resources after elective major noncardiac surgery. Results showed that admission rates in the ICU decreased from 35% to 16% after vascular surgery and from 57% to less than 2% after thoracic surgery. In a quantitative study at the Cleveland Clinic Foundation, United States, Parker et al<sup>20</sup> collected the overnight stay patient data during a 24-month period. They discovered that two specialties, neurosurgery and vascular surgery, were the most common among PACU overnight patients. Both specialties accounted for 39.7% of all PACU overnight cases and 47.2% of PACU overnight hours and patient days during the study period. Quantifying PACU overnight activity during the 2 years clearly reveals that these two surgical specialties accounted for a large percentage of overnight patients. The study findings were used to support the development of a 14-bed vascular and a 9-bed multispecialty step down unit.

A prospective study conducted in Israel by Ziser et al<sup>9</sup> investigated 400 patients over 33 months. Two hundred eighty-one (70.3%) patients were mechanically ventilated on admission to PACU, and 311 patients (77.8%) received invasive monitoring. Results revealed that patients' mean length of stay was 12.9 hours. An alarming observation of this study was that 18 patients (4.5%) died in the PACU while waiting for ICU beds. The main problems identified in this study were insufficient medical and nursing coverage, inadequate communication, and lack of visiting

facilities for patients' families. In addition, there is a psychological effect on the patients when they observe other very sick or dying patients in the PACU.

Jones and Harper<sup>21</sup> described the experiences of ventilating patients in the PACU in the United Kingdom. The issue of shortage of ICU beds led to large numbers of interhospital transfers of critically ill patients. Patients received suboptimal care, routine major surgery got disrupted, and staff morale was low, causing problems with recruitment and retention. A 1995 audit showed that the postoperative critical care unit admitted 78% of patients directly from the OR after elective or emergency surgery, whereas 22% were ICU overflow patients. Consequently, cancellation of elective major surgeries was reduced to two to three patients per week. Similarly, Aps<sup>22</sup> established the concept of overnight intensive recovery for patients requiring critical care after major and emergency surgeries.

## Conclusion

Prolonged patient stay in the PACU affects the quality care of other postoperative patients as it increases the workload of a nurse. The availability of beds in PACU changes depending on the condition of each patient. Moreover, if a patient is ready for transfer and beds are not available on the wards, a backlog is created in the PACU, resulting in the slowdown of the surgical schedule that leads to dissatisfaction for surgeons, nurses, patients, and their families.

The literature is consistent in identifying that PACU prolonged stay and ICU overflow is a crucial problem; however, there is scarcity of data on the extent of the practice and consequences on patients and PACU nurses. Perioperative management needs to develop interventions to resolve these issues to improve the care of surgical patients in the PACU. Further research is required to explore the experiences of PACU nurses, patients, and their families.

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