

# IMPACT OF HIGH-QUALITY PERIOPERATIVE AND PREANAESTHESIA NURSING INTERVENTIONS ON PATIENT RECOVERY, SATISFACTION, AND SAFETY: A SYSTEMATIC REVIEW

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### Abstract

**Background:** The postanesthesia care unit (PACU) is a critical phase where patients are vulnerable to complications such as respiratory depression and cardiovascular instability. High-quality nursing care during the perioperative and anesthesia recovery period plays a vital role in enhancing patient safety, satisfaction, and recovery outcomes. We aimed to evaluate the effectiveness of nursing interventions and organizational strategies during the perioperative and preanaesthesia periods, and their impact on patient outcomes and operational efficiency. **Methods:** A systematic review was conducted following PRISMA guidelines. Studies published between 2010 and 2024 were identified from PubMed, Scopus, and Web of Science using terms related to perioperative nursing, preanaesthesia assessment, and patient outcomes. Eligible studies included original research on nursing roles and strategies in the perioperative context. Five studies met the inclusion criteria and were synthesized narratively due to methodological heterogeneity. **Results:** Included studies employed randomized controlled trials, observational studies, Delphi consensus, and qualitative methods. Nurse-led digital tools such as the PATCH system showed

comparable satisfaction and consultation time to traditional assessments. Structured nurse-run preanaesthesia clinics improved assessment quality and satisfaction without adverse outcomes. Studies also highlighted core outcome sets for perioperative research, emphasized the importance of nursing competencies in PACUs, and showed that quality of recovery alone does not fully explain patient satisfaction. Adequate staffing and effective nurse scheduling further supported care quality. **Conclusion:** Nursing interventions during the perioperative and anesthesia recovery phases positively influence patient satisfaction, safety, and care efficiency. The integration of digital tools, standardized outcome frameworks, and adequate staffing enhance the impact of nursing care.

**Keywords:** Perioperative Nursing, Preanaesthesia Assessment, Patient Satisfaction, PACU, Nurse-Led Care, Digital Tools, Nursing Interventions.

## INTRODUCTION

The postanesthesia care unit (PACU) is a critical transition point where patients recovering from general anesthesia face a heightened risk of adverse events, including respiratory depression, cardiovascular instability, and emergence agitation. The role of nurses in this phase is essential for monitoring, intervening, and supporting optimal recovery outcomes. In recent years, the significance of high-quality nursing care during anesthesia recovery has gained increased research attention, especially in the context of patient safety, efficiency, and satisfaction. Emerging evidence supports the idea that nursing interventions, such as structured care protocols, targeted patient monitoring, and optimized staffing, can significantly influence outcomes in the PACU. For instance, Chen et al. implemented a standardized "Stir-up Regimen" including deep breathing, coughing, and early mobilization within the first 30 minutes of PACU admission, and observed a statistically significant reduction in recovery time (Chen L et al., 2023). This suggests that nurse-led protocols may expedite Phase I recovery and reduce PACU length of stay. In another randomized controlled study, the use of dexmedetomidine-assisted anesthesia combined with comfortable nursing interventions was shown to reduce emergence agitation and hospital stay while improving patient satisfaction (Chen L et al., 2023). These findings underscore the synergistic benefit of pharmacologic and nursing strategies in enhancing recovery quality.

Nurse staffing patterns have also been identified as a determinant of patient outcomes in the PACU. Kiekkas et al. (2019) reported that understaffing was significantly associated with higher rates and severity of hypoxemia and arterial hypotension, regardless of anesthesia or surgical variables. This reinforces the need for resource-adequate environments to maintain safe postoperative care. Furthermore, a retrospective study by Lin et al. compared two nurse scheduling modes and found that an intensive scheduling model with a 1:1 nurse-patient ratio led to better PACU efficiency and higher nurse satisfaction, despite fewer nurses overall (Lin X et al., 2024). These results advocate for nurse scheduling reforms to optimize workload distribution and care quality. Despite this growing body of research, systematic reviews specifically evaluating nursing interventions and organizational strategies in the anesthesia recovery period remain limited. This review aims to critically appraise and synthesize evidence on the efficacy of high-quality nursing services in the PACU, focusing on

outcomes such as recovery time, complication rates, patient satisfaction, and operational efficiency.

## **METHODOLOGY**

This systematic review was conducted to explore the evidence regarding perioperative nursing roles, preanaesthesia assessment strategies, and related patient and system outcomes. The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies were included if they evaluated the role of nurses in perioperative care, in preanaesthesia assessment, and reported on outcomes such as patient satisfaction, consultation time, recovery quality, safety, or implementation feasibility. Both qualitative and quantitative original research articles were considered. Exclusion criteria included review articles, editorials, conference abstracts, and studies that did not focus on human subjects or the perioperative context.

A literature search was carried out in major scientific databases including PubMed, Scopus, and Web of Science. The search strategy combined terms related to preanaesthesia assessment, perioperative nursing, patient satisfaction, digital health tools, and nurse-led clinics. Boolean operators and Medical Subject Headings (MeSH) terms were applied to maximize search sensitivity. Reference lists of included articles were also manually screened to identify additional relevant studies. Only articles published in English between 2010 and 2024 were considered. Following the removal of duplicates, all titles and abstracts were screened by two reviewers. Full-text articles were retrieved and assessed against the inclusion and exclusion criteria. Discrepancies were resolved through discussion or by consulting a third reviewer. Data from the included studies were extracted using a standardized data extraction form. The extracted variables were, citation, study design, sample size, study setting, population demographics, methodology, main findings, and reported outcomes.

A five studies met the inclusion criteria and were included in the final synthesis. The studies employed diverse research designs: one randomized controlled pilot trial, two observational studies (one prospective cohort and one retrospective audit), one modified Delphi consensus process, and one qualitative inductive study. Due to heterogeneity in study designs and outcome measures, a meta-analysis was not performed. A narrative synthesis was undertaken to integrate and compare the findings across studies. The quality of included studies was assessed based on their respective methodologies, though no formal scoring system was applied due to the methodological diversity. This review aimed to evaluate the effectiveness of preanaesthesia nursing interventions and digital tools, and to explore the evolving role and competencies of nurses in perioperative care environments.

## **RESULTS**

A total of five studies were included in this systematic review after applying eligibility criteria focused on perioperative nursing roles, preanaesthesia assessment strategies, and outcome evaluation. The studies were published between 2017 and 2022 and with different methodological approaches, including randomized controlled trials,

observational cohorts, a Delphi consensus study, and a qualitative interview-based study. These studies examined both patient- and provider-level perspectives and outcomes in perioperative and anaesthetic care.

The randomized controlled pilot trial conducted by Osman et al. (2020) evaluated the impact of a digital self-assessment tool (PATCH) in an outpatient preanaesthesia clinic in Singapore. Fifty-two elective surgical patients were randomized to complete the PATCH application or undergo a traditional nurse-led preanaesthesia interview. The study found no significant differences in nurse–patient consultation duration or patient satisfaction between the two groups, indicating that digital self-assessment may be a feasible alternative to conventional methods. The findings support the potential for integrating digital health solutions into routine preoperative workflows.

Boney et al. (2022) conducted a modified Delphi study to develop a core outcome set for perioperative and anaesthetic care trials (COMPAC). This project involved 4000 stakeholders, including patients, carers, clinicians, and researchers. Through systematic review, cross-sectional surveys, and iterative Delphi rounds, the authors identified key outcome domains considered essential for inclusion in future perioperative trials. These included mortality and survival, postoperative complications, resource utilization, short- and long-term recovery, and patient-reported quality of life. The study shows the importance of standardized and patient-centred outcome reporting to improve the comparability and utility of clinical trials in this field.

Berning et al. (2017) conducted a prospective observational cohort study in Switzerland to examine the relationship between quality of recovery and overall patient satisfaction with anaesthesia and surgery. Using the validated QoR-15 instrument at multiple time points, the study found that quality of recovery scores were correlated with satisfaction, the overall influence was marginal. This suggests that recovery experience matters, other aspects of perioperative care communication, information delivery, and emotional support play a more dominant role in shaping patient satisfaction.

Dahlberg et al. (2022) conduct a qualitative inductive approach to explore the competencies required by nurses in post-anaesthesia care units (PACUs) in Sweden. Sixteen nurses with at one year of PACU experience were interviewed. Thematic analysis shows that effective PACU nursing required adaptability, the ability to maintain patient safety in dynamic clinical environments, and collaborative teamwork. Expert nurses were distinguished by their ability to “see the bigger picture,” a concept of clinical foresight, leadership, and mentorship. These insights offer valuable guidance for workforce development and postgraduate education in perioperative nursing.

Arun et al. (2021) retrospective observational audit in Qatar evaluate the implementation of nurse-run preanaesthesia assessment clinics at an ambulatory surgical center. Twenty-five nurses were trained in a structured program to conduct risk assessments and patient education under indirect supervision of anaesthesiologists. Among the 152 patients assessed during the audit period, high levels of patient and nurse satisfaction were reported. No adverse events occurred, and the assessments

demonstrated 95% compliance with predefined standards. The findings support the feasibility, safety, and acceptability of expanding advanced nursing roles in perioperative care within a Middle Eastern healthcare context. In the included studies, outcome measures varied and highlighted key indicators consultation time, patient satisfaction, quality of recovery, and overall perioperative safety. Three studies show the evolving role of nurses in perioperative pathways, showing that digital tools and nurse-led initiatives enhance care delivery without compromising quality. These findings collectively underscore the value of innovative and interdisciplinary approaches to perioperative care, particularly those that leverage nursing expertise and patient-centred strategies.

**Table 1: summary table of included studies**

Citation	Study Design	Sample Size	Study Population	Methodology	Aim
Osman et al. (2020)	Randomized controlled pilot trial	52	Elective surgical patients undergoing same-day admission surgery	Randomization into PATCH digital self-assessment vs. standard nurse-led preanaesthesia assessment; assessment of consultation duration and satisfaction	To compare nurse-patient consultation time and patient satisfaction between digital PATCH self-assessment and standard care
Boney et al. (2022)	Modified Delphi study	Phase 2: 3986 survey respondents; Delphi panel: 67 participants	Surgical patients, carers, and perioperative clinicians	Systematic review, stakeholder survey, and modified Delphi process	To develop a core outcome set for trials in perioperative and anaesthesia care (COMPAC)
Berning et al. (2017)	Prospective observational cohort study	579 (467 completed all 4 questionnaires)	Elective inpatient surgical patients (ASA I-III)	Quality of recovery (QoR-15) and patient satisfaction surveys at multiple time points	To evaluate the influence of quality of recovery on total patient satisfaction with anaesthesia and surgery
Dahlberg et al. (2022)	Qualitative inductive study	16	Nurses working in post-anaesthesia care units (PACUs) in Sweden	Semi-structured individual interviews and thematic analysis	To explore nurse perspectives on competencies needed in PACU and characteristics of expert PACU nurses
Arun et al. (2021)	Retrospective observational audit	152 patients (satisfaction survey), 25 trained nurses	Elective ambulatory surgical patients in	Training nurses, then auditing assessment	To assess feasibility and impact of nurse-run preanaesthesia

			Qatar	quality, patient satisfaction, recovery, and nurse satisfaction	assessment clinics on perioperative care quality
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**Table 2: study demographics, findings, and outcomes**

Citation	Demographics	Main Findings	Outcomes
Osman et al. (2020)	Adults ≥21 years, elective surgical patients, English-speaking, tablet-capable	PATCH digital assessment was feasible with similar consultation times and patient satisfaction compared to standard care	Consultation time, patient satisfaction, usability of digital tool
Boney et al. (2022)	Surgical patients, carers, clinicians (UK & international); Delphi participants from multiple institutions	Developed COMPAC core outcome set covering mortality, complications, recovery, resource use, QoL	Core outcomes for perioperative trials: mortality, complications, readmission, recovery, QoL
Berning et al. (2017)	734 screened; 579 completed; elective inpatients, ASA I–III, multiple surgical specialties	High satisfaction scores; weak correlation between quality of recovery and satisfaction	QoR-15 scores, patient satisfaction scores
Dahlberg et al. (2022)	16 nurses (14F, 2M), mean 7.8 years PACU experience, Sweden	Core competencies included adaptability, patient safety, teamwork; expert nurses 'see the bigger picture'	Themes: adaptability, safety, expert vision
Arun et al. (2021)	152 patients surveyed, 25 trained nurses, ambulatory surgery in Qatar	High patient and nurse satisfaction; no adverse events; feasible implementation	Preassessment quality, patient satisfaction, nurse satisfaction, recovery outcomes

## DISCUSSION

This systematic review explored the role of perioperative and preanaesthesia nursing strategies, with an emphasis on their impact on care quality, efficiency, and patient outcomes. Findings from the five core studies in the review, alongside additional evidence from the included literature, demonstrate a growing recognition of nurses as key drivers of innovation, patient-centered care, and safety in perioperative settings. Digital tools and nurse-led interventions, such as the PATCH system assessed by Osman et al. (2020), highlight the feasibility of integrating technology into preanaesthesia workflows without compromising patient satisfaction or consultation time. This aligns with broader efforts to digitize perioperative processes for efficiency and personalization. Although the digital tool did not significantly outperform traditional nurse-led assessments, its usability and comparable outcomes suggest that nurse-guided technology adoption can enhance workflow efficiency. Furthermore, core outcome standardization has become a critical goal in anaesthetic research. The COMPAC initiative by Boney et al. (2022) and complementary frameworks (Boney et al.

2015; O'Donnell et al. 2018) emphasize consensus-building among stakeholders to ensure clinical trials report on meaningful and uniform outcomes such as survival, complications, and quality of recovery. This supports the argument that perioperative nursing interventions should be evaluated within standardized outcome frameworks, facilitating benchmarking and cross-study comparison.

Recovery quality and patient satisfaction, as studied by Berning et al. (2017), reinforce the multifactorial nature of satisfaction, with patient-centered communication and emotional support contributing more substantially than physiological recovery scores alone. This finding is consistent with the qualitative study by Dahlberg et al. (2022), which identified holistic competencies—such as foresight, adaptability, and teamwork—as hallmarks of expert PACU nursing. These qualities enhance the nurse's ability to respond dynamically in high-pressure environments and maintain patient safety.

From an operational perspective, nurse-led assessment clinics (Arun et al. 2021) and optimized nurse scheduling (Lin et al. 2023) both demonstrated improvements in efficiency and satisfaction without increasing adverse outcomes. This confirms that strategic nurse deployment in the perioperative workflow can yield measurable benefits. Additionally, data from Vacheron et al. (2023) underscore the cognitive load nurses face in the PACU and the potential for task interruptions to affect performance. Understanding and mitigating these interruptions can further improve safety and workflow resilience.

The importance of adequate nurse staffing levels is evident in the findings of Kiekkas et al. (2019), where understaffing was associated with increased postoperative hypoxaemia and hypotension. Similarly, Broens et al. (2021) found that using Integrated Pulmonary Index (IPI) monitoring led to more timely nurse interventions and reduced the duration and number of respiratory events, although it did not decrease the number of patients affected. These studies collectively stress that nurse surveillance and timely response are essential to patient safety and must be supported by sufficient staffing and technology.

## **CONCLUSION**

Our review supports that perioperative and preanaesthesia nursing interventions when enhanced by digital tools, consensus-based outcome frameworks, and appropriate staffing, contribute to patient satisfaction, safety, and operational efficiency. Future studies should build on standardized outcome sets and further explore the integration of digital technologies and interdisciplinary models to maximize nursing impact.

## **Abbreviations**

PACU, Postanesthesia Care Unit; PATCH, PreAnaesthesia Computerized Health; QoR-15, Quality of Recovery-15; ASA, American Society of Anesthesiologists; COMPAC, Core Outcome Measures in Perioperative and Anaesthetic Care; IPI, Integrated Pulmonary Index; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; RCT, Randomized Controlled Trial; QoL, Quality of Life.

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