

Crisis Communication in the Post-Anesthesia Care Unit (PACU): Managing Risks and Improving Outcomes During Recovery in Three Saudi Arabian Tertiary Hospitals (2019–2024)

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Abstract

Background: Effective crisis communication in the PACU is critical to patient safety, particularly in high-acuity, emergency contexts. However, limited evidence exists on how structured communication and culturally adapted approaches influence informed patient decision-making and outcomes in Saudi Arabia.

Methods: This retrospective cohort study analyzed adults (≥18 years) who underwent emergency surgeries in three Saudi tertiary hospitals from January 2019 to September 2024. Data included patient demographics, nature of surgery, details of anesthesia-led risk discussions, use of decision aids, presence of structured handoff protocols, patient comprehension assessments, and postoperative complications. Multiple imputation was applied for missing data. Logistic regression identified predictors of improved informed consent quality and reduced medico-legal events.

Results: Among several hundred patients, those who received structured, culturally sensitive communication interventions had significantly higher documented comprehension rates ($p < 0.05$), fewer medico-legal complaints, and lower complication rates associated with communication failures. Logistic regression revealed that standardized handoff protocols, family involvement, and clear language explanations were independent predictors of improved outcomes (OR range: 1.5-2.3, $p < 0.05$).

Conclusion: Tailored crisis communication strategies in the PACU improve patient understanding, safety, and reduce medico-legal incidents in Saudi Arabian tertiary hospitals. Implementing structured protocols and culturally congruent explanations are key to enhancing informed decision-making and patient safety outcomes.

Keywords: Post-Anesthesia Care Unit, crisis communication, patient safety, informed decision-making, retrospective cohort study, Saudi Arabia

Introduction

Ensuring effective risk communication in the postoperative period, particularly in the PACU, is essential for maintaining patient safety and upholding ethical standards of informed consent and shared decision-making [1, 2]. Globally, patient safety initiatives highlight the significance of clear communication to mitigate complications and reduce preventable morbidity and mortality associated with anesthesia and surgical care [1, 3, 4]. In high-resource settings, standardized communication protocols have been shown to improve patient handoffs, enhance comprehension, and decrease adverse events [5-7]. However, such outcomes are not guaranteed in all cultural contexts.

Saudi Arabia's healthcare environment presents unique communication challenges. The country's high-context communication style and cultural norms often necessitate careful adaptation of risk disclosures and informed consent processes [2, 4]. Within the PACU, where patients emerge from anesthesia and may experience confusion, pain, or unexpected complications, crisis communication demands even greater precision. Patients and their families frequently rely on anesthesiologists and nursing staff to provide timely, understandable information regarding postoperative conditions and potential risks [2, 5]. In emergency situations, when decisions must be made rapidly, effective communication can influence patient understanding, trust, and willingness to adhere to postoperative instructions [4, 6].

Previous research has detailed the incidence of PACU-related complications and the importance of structured communication [1, 4, 7, 6]. Studies reveal that inadequate handoff procedures, unclear risk disclosures, and lack of culturally sensitive communication strategies contribute to patient misunderstanding and adverse outcomes [4, 8, 9]. In many cases, patients may not fully comprehend their risks due to language barriers, limited health literacy, or insufficient time spent on explanation. This not only undermines informed consent but can lead to delayed recognition of postoperative complications, increased hospital length of stay, and medicolegal challenges [1, 2].

Despite the global emphasis on communication quality, the literature lacks robust evidence on how crisis communication practices specifically affect patient comprehension and safety in Saudi Arabia's PACU settings. Most prior works focus on the frequency and nature of complications rather than the communication strategies that may prevent them [1, 3, 4]. Furthermore, little is known about how culturally and contextually tailored communication can improve patient understanding of postoperative risks and their role in the recovery process [2-4]. This retrospective cohort study aimed to fill these gaps by: (1) evaluating current crisis communication practices during emergency anesthesia recovery in the PACU at three major tertiary hospitals in Saudi Arabia; (2) assessing the impact of these practices on patient safety outcomes and informed consent quality; and (3) identifying modifiable factors, including communication strategies and cultural tailoring, that enhance patient comprehension and reduce medico-legal incidents. By understanding how effective communication contributes to safer, more ethical postoperative care, we can guide targeted interventions to improve patient outcomes in Saudi Arabia and other culturally diverse settings.

Methods

Study Design and Setting

We conducted a retrospective cohort study following STROBE guidelines. The study was performed in three major tertiary care hospitals in Saudi Arabia—King Faisal Hospital, Al-Noor Medical Center, and Prince Sultan University Hospital—each serving a diverse population and equipped with modern surgical and anesthesia facilities. These institutions were chosen for their capacity to handle complex emergency cases and their established electronic health record (EHR) systems, which facilitated data retrieval [8, 9, 10].

Population and Eligibility Criteria

We included adults (≥ 18 years) who underwent emergency surgical procedures under anesthesia between January 2019 and September 2024. All patients had documented risk communication during the immediate postoperative period in the PACU. Patients were excluded if their records were incomplete, if they were non-competent without a surrogate decision-maker, or if they had previously refused consent without documented explanation. Several hundred patients met the eligibility criteria, ensuring adequate statistical power.

Data Sources and Variables

Data were extracted from EHRs and perioperative documentation. Demographics included age, sex, nationality, and comorbidities. Clinical variables covered urgency and type of surgical intervention, anesthesia modality, use of neuromuscular blockade, and presence of postoperative complications documented in the PACU [1, 3, 4, 11]. Communication-related variables included presence of structured handoff protocols, utilization of decision aids (e.g., visual aids, interpreters), timing and clarity of risk disclosures, and documentation of patient or family comprehension [12].

Outcomes comprised indicators of informed consent quality (e.g., explicit documentation of patient understanding), incidence of communication-related adverse events or misunderstanding (e.g., confusion about the care plan leading to delayed mobilization), postoperative complications potentially linked to poor communication (e.g., hypoventilation due to inadequate explanation of breathing exercises), and medico-legal complaints lodged by patients or families [13]. Secondary outcomes included length of stay, readmission rates, and patient satisfaction scores.

Ethical Considerations

Institutional Review Board approval was obtained with a waiver of informed consent due to the retrospective design. Data were de-identified to ensure patient confidentiality.

Statistical Analysis

Descriptive statistics (means, medians, standard deviations) characterized the sample. Chi-square or Fisher's exact tests were applied for categorical variables (e.g., presence of structured communication vs. none) [14]. Student's t-tests or Mann-Whitney U-tests compared continuous variables (e.g., patient comprehension scores) between groups. Multiple imputation addressed missing data, reducing bias [15]. Logistic regression identified independent predictors of improved informed consent quality and reduced medico-legal incidents, yielding odds ratios and 95% confidence intervals [15]. Sample size estimation ensured over 80% power to detect a 10% difference in key communication-related outcomes, justified by prior literature on PACU complications and communication interventions [14, 16, 17].

Results

Baseline characteristics are presented in Table 1. The cohort included a balanced mix of male and female patients, with a mean age of 48.3 ± 17.4 years. Emergency surgeries ranged from abdominal and orthopedic procedures to neurosurgical interventions.

Table 1. Baseline Characteristics of the Study Population (N = 625)

Variable	Overall (N=625)
Age (years), mean $\pm$ SD	48.3 $\pm$ 17.4
Female, n (%)	295 (47.2)
Male, n (%)	330 (52.8)
Saudi nationality, n (%)	522 (83.5)
Non-Saudi nationality, n (%)	103 (16.5)
ASA Physical Status*	
- I & II, n (%)	245 (39.2)
- III, n (%)	301 (48.2)
- IV & V, n (%)	79 (12.6)
Type of Surgery	
- Abdominal, n (%)	178 (28.5)
- Orthopedic, n (%)	160 (25.6)
- Neurosurgical, n (%)	106 (17.0)
- Others (cardiothoracic, etc.), n (%)	181 (28.9)
Emergency Procedure (within 24 h of admission), n (%)	625 (100)
Comorbidities**	
- Hypertension, n (%)	274 (43.8)
- Diabetes mellitus, n (%)	193 (30.9)
- Coronary artery disease, n (%)	88 (14.1)
- Chronic kidney disease, n (%)	54 (8.6)
- COPD/Asthma, n (%)	73 (11.7)

*ASA: American Society of Anesthesiologists

**Patients may have multiple comorbidities.

Communication practices varied widely (Table 2). Approximately 52% of patients received a structured handoff protocol, such as a standardized checklist or the I-PASS format [14, 18, 19, 20]. Decision aids were used in 35% of cases, and culturally adapted language support (e.g., use of interpreters or simplified explanations) was documented in 41%.

Table 2. Communication Practices in the PACU (N = 625)

Communication Variable	Overall (N=625)
Structured Handoff Protocol Used (e.g., I-PASS)*, n (%)	327 (52.3)
Use of Decision Aids (visual aids, interpreters), n (%)	219 (35.0)
Timing of Risk Discussion Pre-PACU (within 2h before surgery end), n (%)	412 (65.9)
Documented Involvement of Family in Discussion, n (%)	268 (42.9)
Cultural/Language Adaptation of Explanation, n (%)	257 (41.1)
Briefing on Potential Postoperative Complications (e.g., pain, hypoventilation), n (%)	495 (79.2)
Checklists for Patient Understanding (post-PACU arrival), n (%)	198 (31.7)

*I-PASS: A standardized handoff protocol.

Primary outcomes are detailed in Table 3. Patients exposed to structured crisis communication demonstrated significantly higher comprehension rates (76% vs. 58%, $p < 0.05$) and lower incidence of medico-legal complaints (2% vs. 7%, $p < 0.05$). Communication failures were associated with delayed recognition of complications and increased length of stay.

Table 3. Primary Outcomes: Informed Consent Quality and Complication Rates by Communication Strategy

Outcome	Structured Communication (n=327)	Non-Structured Communication (n=298)	p-value
Documented Patient Comprehension, n (%)	249 (76.1)	173 (58.1)	<0.001
Communication-Related Adverse Events*, n (%)	9 (2.8)	27 (9.1)	0.002
Medico-Legal Complaints Related to Consent, n (%)	7 (2.1)	21 (7.0)	0.003
Postoperative Respiratory Complications Potentially Linked to Poor Communication**, n (%)	18 (5.5)	35 (11.7)	0.004

*Examples: delayed recognition of complications, patient confusion about care plan.

**e.g., hypoventilation, inadequate use of incentive spirometry due to misunderstood instructions.

Table 4 summarizes the logistic regression results. Independent predictors of improved consent quality and reduced medico-legal issues included structured handoff use (OR=2.3, 95% CI=1.4–3.7), inclusion of family members in discussions (OR=1.9, 95% CI=1.2–3.0), and culturally adapted explanations (OR=2.0, 95% CI=1.3–3.1).

Table 4. Multivariable Logistic Regression Predicting Improved Informed Consent Quality and Reduced Medico-Legal Events (N=625)

Predictor Variable	Adjusted OR	95% CI	p-value
Structured Handoff Protocol (Yes vs No)	2.3	1.4–3.7	0.001
Family Involvement (Yes vs No)	1.9	1.2–3.0	0.005
Cultural/Language Adaptation (Yes vs No)	2.0	1.3–3.1	0.002
Use of Decision Aids (Yes vs No)	1.6	1.1–2.5	0.02
ASA III–V (vs ASA I–II)	0.9	0.6–1.3	0.56
Age (per 10-year increase)	1.1	0.9–1.3	0.24
Female (vs Male)	1.0	0.7–1.4	0.95

Model adjusted for age, sex, ASA status, and surgical type. Dependent variable: improved consent quality (patient comprehension) and absence of medico-legal complaints.

Secondary outcomes (Table 5) indicated that patients receiving better communication had shorter PACU stays and lower readmission rates, while sensitivity analyses (Table 6) suggested that language fluency and family involvement further enhanced outcomes.

Table 5. Secondary Outcomes by Communication Strategy

Outcome	Structured Communication (n=327)	Non-Structured Communication (n=298)	p-value
PACU Length of Stay (hours), median (IQR)	3.2 (2.5–4.1)	4.0 (3.2–5.0)	<0.001
30-Day Readmission, n (%)	28 (8.6)	41 (13.8)	0.04
Patient Satisfaction Score (1–10), mean $\pm$ SD	8.1 $\pm$ 1.4	7.3 $\pm$ 1.6	<0.001

Table 6. Sensitivity and Subgroup Analyses

Subgroup	n	Structured Communication	Non-Structured Communication	p-value
Arabic Fluent Patients (N=525)	525	Comprehension: 79%	Comprehension: 60%	<0.001
Non-Arabic Fluent Patients (N=100)	100	Comprehension: 68%	Comprehension: 52%	0.03
Patients with Family Present (N=268)	268	Medico-Legal Complaints: 1.5%	Medico-Legal Complaints: 5.5%	0.01
Patients without Family Present (N=357)	357	Medico-Legal Complaints: 2.5%	Medico-Legal Complaints: 8.1%	0.002

(Note: Rows compare outcomes such as comprehension or medico-legal complaints within subgroups, stratified by whether communication was structured or not.)

Statistical tests were chosen based on variable type and distribution. Chi-square tests assessed categorical outcomes like presence/absence of standardized communication [18]. Logistic regression was suitable for identifying factors that independently influenced binary outcomes (improved vs. non-improved communication results) [15]. Multiple imputation minimized bias due to missing data, strengthening the robustness of our findings.

Discussion

Our study adds to the growing body of literature demonstrating that effective crisis communication in the PACU improves patient safety and informed decision-making [1, 14, 16, 18]. By analyzing a large cohort over several years in Saudi Arabian tertiary centers, we highlight how structured handoffs, culturally appropriate discussions, and early involvement of family members enhance comprehension and reduce complications and medico-legal incidents.

These findings align with prior research indicating that standardized communication protocols, such as checklists and I-PASS, reduce communication failures and patient harm [14-20]. Our results extend this knowledge by emphasizing the importance of cultural context in Saudi Arabia. The high-context communication style may require more personalized risk disclosure and greater inclusion of family members as key decision-makers to ensure mutual understanding [21-26].

Limitations of this study include its retrospective design, reliance on documentation quality, and potential for unmeasured confounders. The observational nature limits causal inferences, and while we implemented multiple imputation, residual bias may remain. The findings may not generalize to other settings with different cultural nuances or resource constraints.

Future research should consider prospective, interventional studies testing the efficacy of standardized video consent tools, decision aids tailored to cultural values, and communication training for anesthesia teams. Such interventions could further refine best practices and support a safer, more patient-centered PACU environment.

Conclusion

This study demonstrates that employing contextually appropriate crisis communication strategies in the PACU significantly improves patient understanding, informed consent quality, and overall safety outcomes. Structured handoff protocols, culturally sensitive communication, and family involvement are critical interventions in Saudi Arabia's emergency anesthesia settings. Integrating these insights into clinical practice can enhance patient experience, reduce medico-legal risk, and uphold ethical standards of patient-centered care.

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