

Postoperative Nausea and Vomiting (PONV) Practices in a Tertiary Hospital with Low PONV Incidence

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Background

- Postoperative nausea and vomiting (PONV) affects approximately 30% of surgical patients and up to 80% of high-risk populations, contributing to decreased patient satisfaction, prolonged recovery, readmissions, and increased healthcare utilization (Gan et al., 2020).
- Increased ambulatory surgery, early mobilization and discharge, early oral intake, opioid use, and perioperative dehydration further elevate PONV risk (Elvir-Lazo, 2020).
- The Fourth Consensus Guidelines, established by an international expert panel under the American Society for Enhanced Recovery and the Society for Ambulatory Anesthesia, provide evidence-based recommendations to standardize and optimize the prevention and management of postoperative nausea and vomiting (Gan et al., 2020).
- Comprehensive and evidence-based algorithm provide recommendation on identification of high-risk patients, risk stratification, prevention, multimodal treatment, and enhanced recovery pathways for PONV management (Gan, et al., 2020).
- PONV risk assessment tools, such as the Apfel score, provide an objective method to predict PONV, identify high-risk patients, and guide multimodal prophylaxis; predictors include female sex, history of PONV, nonsmoking status, and postoperative opioid use, amongst others (Elvir-Lazo, 2020).
- Despite no formal PONV protocol, a tertiary hospital in West Texas reported a 10 percent PONV rate in 2023 (UMC, 2023) prompting evaluation of whether existing practices align with evidence-based guidelines and explain the lower incidence.

Research Aims

- Explore existing PONV management practices in alignment with the current EBP guidelines.
- Identify nurses' contribution in the reduction of the PONV incidence.
- Provide evidence-based practice recommendations for more standardized PONV management plan to further lessen the incidence of PONV.

Methodology

- 2272 records were randomly selected from outpatient surgical cases in 2023.
- Eligible patients were adults (18-89 years old) who underwent GA with same-day discharge.
- Exclusion criteria were patients from emergency department, consequent hospital admission, and procedures under local anesthesia, monitored anesthesia care or moderate/conscious sedation.
- Data collected included patient demographics, surgery type, perioperative medications and treatments, PONV occurrence, and risk factors based on the Apfel score (sex, history of PONV or motion sickness, smoking status, and postoperative opioid use); due to routine postoperative opioid prescribing, all patients were assigned one point for opioid use.
- Records were analyzed for risk assessment, prophylaxis, mitigation strategies, and PONV occurrence using descriptive and correlational statistics, with significance set at p less than 0.05, and compared with the Fourth Consensus Guidelines.

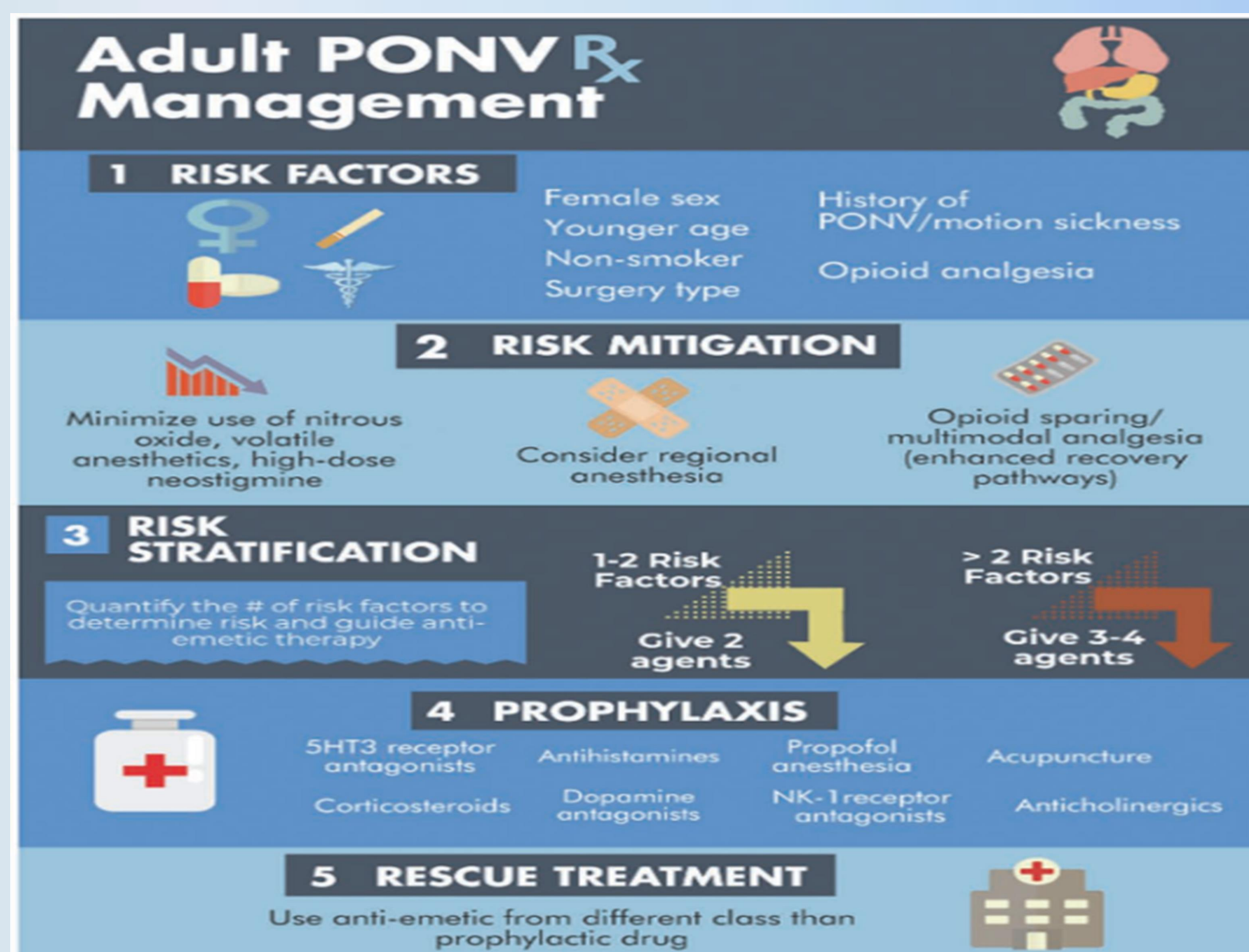


Figure 1. Algorithm for 4th PONV management in guidelines in adults used for comparing current PONV management practices of UMC perioperative caregivers (Figure obtained from the American Society for Enhanced Recovery with permission; Copyright 2020 by International Anesthesia Research Society).

Results

Table 1. Population Demographics (OPS, UMC, 2023)

Characteristic	Total n= 2272	Number of Patients	Percentage per total population (2272)	PONV rate per total PONV population (420)
Sex				
Female		1165	51%	65% (272)
Male		1107	49%	35% (148)
Number of PONV risks (APFEL Score)				
1 to 2		1157	50.92%	38%
3 to 4		1115	49.08%	62%
Surgical Procedure				
DENTAL		109	4.80%	3% (11)
ENT		299	13.16%	15% (64)
GENERAL SURGERY		565	24.87%	29% (121)
GYNECOLOGY		179	7.88%	10% (43)
NEUROSURGERY		56	2.46%	2% (7)
OPHTHALMOLOGY		115	5.06%	5% (21)
ORTHOPEDECS		675	29.71%	27% (114)
UROLOGY		190	8.36%	7% (30)
VASCULAR		84	3.70%	2% (9)
PONV Experience				
No PONV		1852	82%	
With PONV		420	18%	

- In Table 1, 18% of total population studied experienced PONV. This result was based on nurses' documentation on use of antiemetics and presence of PONV while in PACU, OPS and discharge phone-calls.
- Patients who underwent general (29%) and orthopedic (27%) surgeries had the highest rates of PONV.
- As Apfel scores increased, the likelihood of PONV also increased, with a significant association between higher risk scores and PONV occurrence ($\chi^2(1) = 35.20, p < 0.001$).

Table 2. Relationship of mitigating strategies used, PONV experience and PONV risk factors (OPS, UMC, 2023)

Mitigating Strategies Used	No. of Patients	PONV	NON-PONV	1-2 risk factors	3 and more risk factors
0	71 (3%)	11 (15.49%)	60 (84.51%)	41 (58%)	30 (42%)
1 to 2	990 (44%)	152 (15.35%)	838 (84.65%)	527 (53%)	463 (47%)
3 and more	1211 (53%)	257 (21.22%)	954 (78.78%)	589 (49%)	622 (51%)
Total	2272	420	1852	1157	1115

Pearson $\chi^2(2) = 12.8852$ PR = 0.002

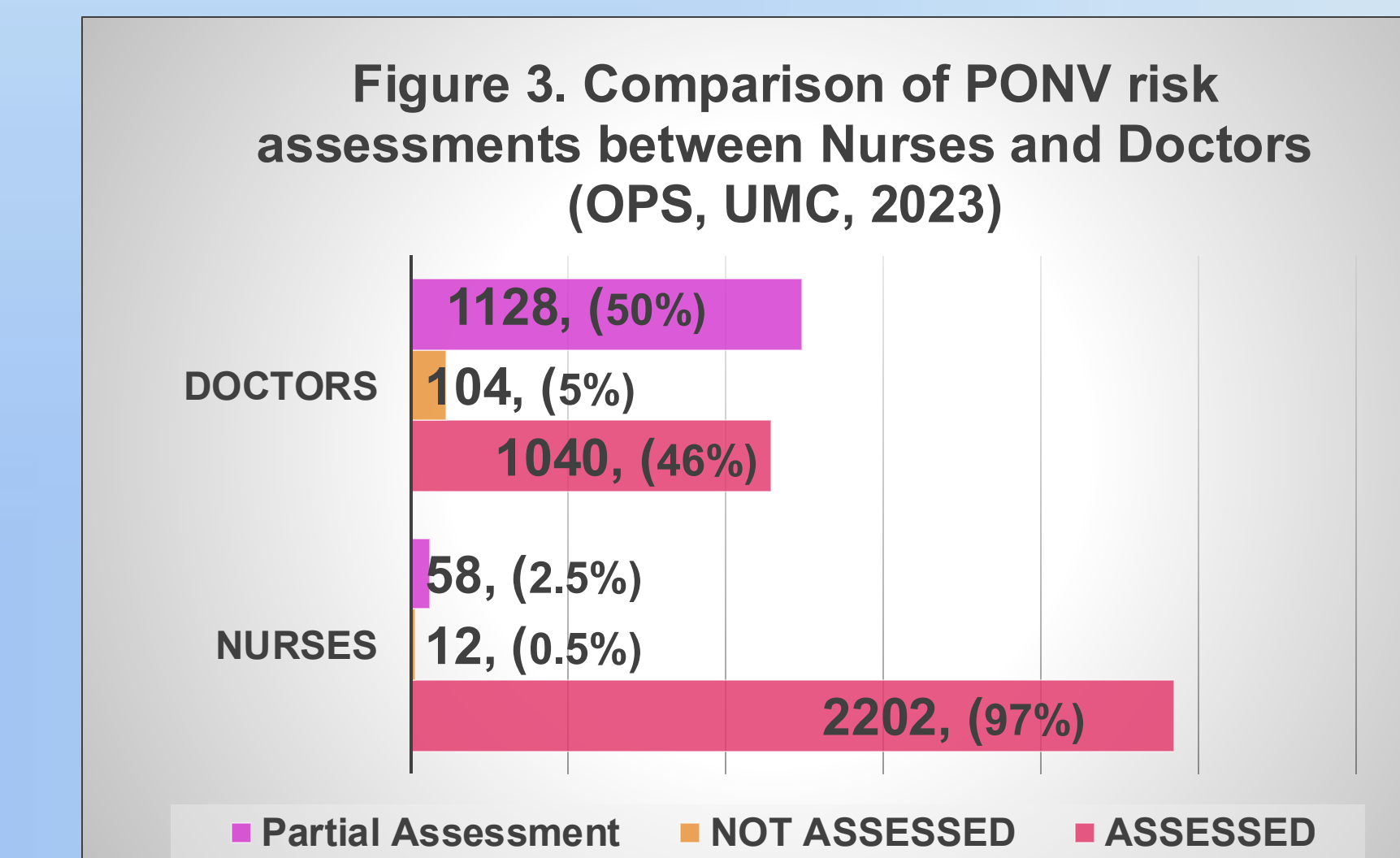
- Table 2 showed approximately 97 percent of patients received at least one mitigation strategy, with 53 percent receiving three or more.
- While 85 percent of patients receiving no or one to two strategies remained PONV-free, only 79 percent of those receiving three or more strategies avoided PONV, demonstrating a significant association between mitigation number and PONV occurrence ($\chi^2(2) = 12.89, p = 0.002$).
- PONV incidence was highest in the ≥ 3 strategy group (21.22%), suggesting that increased mitigation alone did not correspond to lower PONV rates and likely reflects greater baseline risk among these patients rather than strategy number alone.

Table 3. Relationship of prophylaxis used, PONV experience and PONV risk factors (OPS, UMC, 2023)

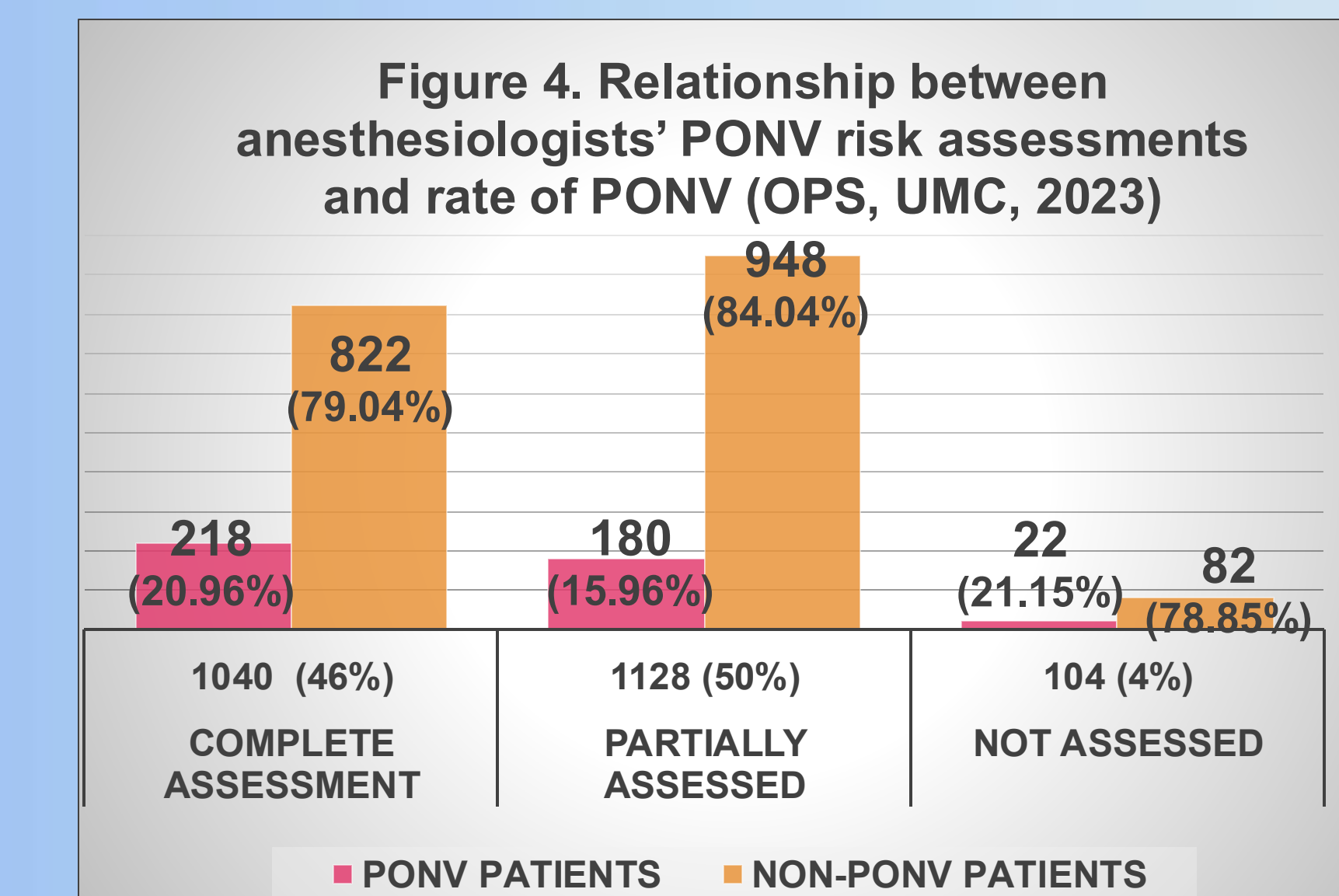
Prophylaxis Used	No. of patients	PONV	NON-PONV	1-2 risk factors	3 and more risk factors
0	27 (1.2%)	1 (3.7%)	26 (96.3%)	17 (63%)	**10 (37%)
1	124 (5.5%)	20 (16.13%)	104 (83.87%)	66 (53%)	**58 (47%)
2	637 (28%)	90 (14.13%)	547 (85.87%)	358 (56%)	**279 (44%)
3 and more	1484 (65.3%)	309 (20.82%)	1175 (79.18%)	716 (48%)	768 (52%)
Total	2272	420	1852	1157	1115

Pearson $\chi^2(3) = 17.7730$ PR = 0.000 ** less prophylaxis given than recommended

- In Table 3, a significant association was observed between number of prophylactic agents and PONV (Pearson $\chi^2(3) = 17.77, p < .001$), 98.8% received ≥ 1 antiemetic and 65.3% received ≥ 3 agents.
- PONV was lowest with no prophylaxis (3.7%) and highest with ≥ 3 agents (20.8%).
- Prophylaxis increased with risk: 69% of patients with ≥ 3 risk factors (n=1115) received ≥ 3 agents, while 31% were under-treated, suggesting higher PONV rates reflect baseline risk rather than prophylaxis failure.
- These findings demonstrate variability in risk-aligned prophylaxis and support implementation of a standardized Apfel-based protocol.



- Figure 3 shows that over half of anesthesia evaluations were incomplete, reflecting inconsistent physician risk assessment compared with high nursing completion rates and contributing to variability in risk stratification and prevention strategies.
- In figure 4, PONV affected 20.96% of patients with complete anesthesia assessment, 15.96% with partial assessment, and 21.15% for those not assessed.
- The statistical significance of the difference in PONV prevalence between anesthesia assessment levels ($\chi^2(2) = 9.51, p = 0.009$) suggested substantial relationship between anesthesia assessment level and PONV.
- The lack of a standardized tool such as the Apfel score likely contributes to this discrepancy and may affect overall PONV outcomes.



Conclusion

- The institutional PONV rate in 2023 was 18 percent, with mitigation and prophylaxis practices generally aligned with evidence-based guidelines despite the absence of a standardized protocol.
- Higher PONV rates among patients receiving more interventions reflected greater baseline risk rather than prophylaxis failure.
- A discrepancy between nursing and anesthesia risk assessments, likely related to the absence of a standardized tool such as the Apfel score, suggests variability in risk stratification and prevention strategies.
- Implementation of an Apfel-based, guideline-aligned PONV protocol may improve consistency in risk documentation, interdisciplinary communication, and outcomes.
- Perioperative nurses play a central role through risk identification, communication, and advocacy for evidence-based mitigation and prophylaxis strategies.

References

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