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The Role of Nurses in Early Identification and Management of Postoperative Nausea and Vomiting

Rawan Tallaa Altalaa AlDhuwaihi[1], Ghadah Salem Ghattar Almutairi[2], Meznah Mashni Alruwiliy[3], Talal.Qasem Shabi[4], Alanazi Rasheed Sulaiman A[5], Mohammed Zayed Alqarni[6], Shouq Mohammed Al-Hassan[7], Mfrah Hwal Nadien Alruwaili[8], Alrayes, Alaa Hammad F[9], Abdulaziz Dhaifallah S Alanazi[10]

[1] Nursing Specialist – Specialist Dental Center – Al Jouf Health Cluster – Ministry of Health – Sakaka – Al Jouf Region – Saudi Arabia
Email: rawanta911@gmail.com
[2] Nursing Technician – North Medical Tower – Northern Borders Health Cluster – Ministry of Health – Arar – Northern Borders Region – Saudi Arabia
Email: m6iriah@hotmail.com
[3] Nursing Technician – King Abdulaziz Specialist Hospital – Al Jouf Health Cluster – Ministry of Health – Sakaka – Al Jouf Region – Saudi Arabia
Email: Mzzzn1990@gmail.com
[4] Nursing – King Fahad Hospital – Madinah Health Cluster – Ministry of Health – Madinah – Madinah Region – Saudi Arabia
Email: Tshabi@moh.gov.sa
[5] Nursing Technician – Health Control Centre in Haditha – Al Jouf Health Cluster – Ministry of Health – Al Qurayyat – Al Jouf Region – Saudi Arabia
Email: n3n3_949@hotmail.com
[6] Nursing Technician – Directorate of Health Affairs – Tabuk Health Cluster – Ministry of Health – Tabuk – Tabuk Region – Saudi Arabia
Email: alqarni100@hotmail.com
[7] Nursing Specialist – Dumat Al-Jandal General Hospital, Nursing Services, Pediatrics – Al Jouf Health Cluster – Ministry of Health – Dumat Al-Jandal – Al Jouf Region – Saudi Arabia
Email: Sshoog1420@gmail.com
[8] Nursing Technician – Al-Qurayyat General Hospital – Al Jouf Health Cluster – Ministry of Health – Al Qurayyat – Al Jouf Region – Saudi Arabia
Email: mfrh-355@hotmail.com
[9] Neonatal Nursing Specialist – Dumat Al-Jandal General Hospital – Al Jouf Health Cluster – Ministry of Health – Dumat Al-Jandal – Al Jouf Region – Saudi Arabia
Email: Alrayesalaa11@gmail.com
[10] Nursing Specialist – Forensic Medical Services Center – Northern Borders Health Cluster – Ministry of Health – Arar – Northern Borders Region – Saudi Arabia
Email: Yu0o@hotmail.com

ABSTRACT: Nurses play a crucial role in the early identification and management of postoperative nausea and vomiting (PONV), a common complication that can significantly impact patient recovery and satisfaction following surgical procedures. Their responsibilities begin preoperatively, where thorough assessments and patient education

about PONV risks can set the foundation for effective management strategies. During this phase, nurses gather pertinent information regarding patient history, including previous experiences with PONV, medications, and surgical procedures that may predispose patients to nausea and vomiting. This preemptive approach allows nurses to collaborate with the surgical and anesthetic teams to develop tailored prophylactic regimens, including pharmacological and non-pharmacological interventions, thereby minimizing the likelihood of PONV. Postoperatively, nurses are instrumental in monitoring patients for signs of nausea and vomiting, providing timely assessments and interventions to alleviate symptoms. They utilize evidence-based protocols to implement antiemetic medications and other supportive measures, such as promoting comfort and hydration. Furthermore, effective communication and patient education are vital components of nursing care in this context. By equipping patients with information about PONV management and encouraging them to report symptoms early, nurses empower patients to participate in their own recovery. Overall, the proactive role of nurses in both the prevention and management of PONV not only enhances patient outcomes but also contributes to a smoother recovery process.

INTRODUCTION

Postoperative nausea and vomiting (PONV) remains one of the most common and distressing complications after anesthesia and surgery, affecting approximately 30% of all surgical patients and up to 80% of those with identifiable risk factors [1]. It is not a minor inconvenience: PONV can delay recovery, prolong post-anesthesia care unit (PACU) stays, increase unplanned admissions, raise healthcare costs, and reduce patient satisfaction with the surgical experience [2]. Within this clinical landscape, nurses occupy a central position because they are the professionals who observe patients continuously across the preoperative, intraoperative-recovery, and postoperative phases. They are often the first to detect subjective nausea, early retching, pallor, swallowing, tachycardia, and other subtle signs that precede vomiting [2]. The nurse's role therefore extends far beyond administering prescribed antiemetics. It includes systematic risk assessment, structured monitoring, timely rescue intervention, patient education, documentation, advocacy for opioid-sparing analgesia, and participation in quality improvement.

Understanding the physiological basis of PONV is essential for effective nursing assessment and intervention. PONV arises from complex interactions among central and peripheral emetic pathways, including the chemoreceptor trigger zone in the area postrema, the vomiting center in the medulla, vagal afferents from the gastrointestinal tract, and higher cortical and limbic modulation [3]. Multiple neurotransmitter systems are involved, including serotonin, dopamine, histamine, acetylcholine, substance P, and opioid-mediated signaling [3]. Receptors that can initiate nausea and vomiting include dopamine type-2, serotonin type-3, histamine type-1, muscarinic cholinergic type-1, and neurokinin type-1 receptors [4]. Surgical trauma, anesthetic agents, opioid analgesics, hypovolemia, and anxiety converge on these pathways to produce the emetic reflex [4]. For the bedside nurse, this pathophysiology has a practical implication: because multiple receptor systems are involved, no single intervention is universally effective, and a multimodal approach—combining pharmacological and non-pharmacological strategies—is required [5]. Moreover, because nausea is subjective, patients may underreport it unless nurses actively ask about it and observe for non-verbal signs [2]. The clinical significance of PONV extends beyond immediate discomfort. Severe or prolonged PONV can cause dehydration, electrolyte imbalance, wound dehiscence, aspiration, and psychological distress [5]. It can also delay discharge from ambulatory surgery units, precipitate unplanned admission, increase nursing workload, and reduce patient satisfaction [1]. In economic terms, PONV contributes to both direct costs, such as extended recovery room stays and additional antiemetic treatment, and indirect costs, such as lost productivity and unplanned healthcare contact [2]. These consequences explain why early identification and proactive management are matters of clinical safety, operational efficiency, and patient-centered care, not merely comfort [1].

Risk Factors and Risk Stratification

The first step in early identification is systematic risk stratification. PONV risk factors are conventionally categorized as patient-related, anesthesia-related, and surgery-related [6]. Patient-related factors include female gender, history of PONV or motion sickness, non-smoking status, age below 50 years, and, in some models, obesity and anxiety [6]. Anesthesia-related factors include the use of volatile anesthetics, nitrous oxide, intraoperative and postoperative opioids, prolonged duration of anesthesia,

and increased doses of neostigmine [6]. Surgery-related factors include extended surgical procedures and specific procedure types such as neurosurgery, laparoscopic surgery, cholecystectomy, intra-abdominal surgery, and gynecological surgery [7]. These categories are summarized in Table 1. The Apfel simplified risk score is the most widely used and cross-validated tool for PONV risk stratification in adults [7]. It assigns one point each for female sex, non-smoking status, history of PONV or motion sickness, and postoperative opioid use. Total scores correspond to approximate PONV incidences of 10%, 20%, 40%, 60%, and 80% for zero, one, two, three, and four risk factors, respectively [7]. The score's simplicity makes it particularly suitable for nurse-led preoperative assessment. The Koivuranta score and other validated models provide additional options, although the Apfel score remains the most widely embedded in clinical practice [8]. Research has shown that nurses can reliably administer these risk scores in the preoperative period, and that such assessment should be integrated into nursing care planning for patients identified as at risk [9]. A study of surgical patients found that mean Apfel and Koivuranta scores were 1.88 ± 1.16 and 2.35 ± 1.07, respectively, with 45.9% of patients experiencing nausea and 23.6% experiencing vomiting postoperatively, reinforcing the clinical relevance of routine risk scoring [9]. However, risk scoring is not a static, one-time event. The nurse must recognize that a patient's risk profile can evolve, and dynamic reassessment upon admission to the PACU is essential, particularly because the interpretation of factors such as non-smoking status and opioid administration can vary in the immediate recovery period [2]. The fourth consensus guidelines emphasize that patients at moderate-to-high risk—typically Apfel score ≥2—should receive multimodal prophylaxis, and nurses are pivotal in ensuring that this risk-stratified approach is implemented at the point of care [1].

Table 1. PONV Risk Factors in Adults

Category	Risk Factors
Patient-related	Female gender; history of PONV; motion sickness; non-smoking status; age <50 years
Anesthesia-related	General anesthesia versus regional anesthesia; prolonged duration; volatile agents; nitrous oxide; intraoperative and postoperative opioids; neostigmine >3 mg
Surgery-related	Extended procedures; neurosurgery; laparoscopic surgery; cholecystectomy; intra-abdominal surgery; gynecological surgery

Table 2. Apfel Simplified PONV Risk Score

Number of Risk Factors	Approximate PONV Risk (%)	Risk Category
0	10	Low
1	21	Mild
2	39	Moderate
3	61	High
4	79	Extremely high

Risk factors: female sex, history of PONV or motion sickness, non-smoker, postoperative opioids.

The Nurse's Role in Early Identification

The early identification of PONV begins in the preoperative period and continues through the PACU and the postoperative ward. Each phase demands a distinct set of nursing competencies and a consistent commitment to structured assessment [10].

Preoperative Assessment and Risk Scoring

The preoperative encounter is the optimal window for identifying patients who will require intensified prophylaxis. Nurses in preadmission testing and surgical clinics are well positioned to obtain a history of prior PONV, motion sickness, smoking status, and current opioid use [10]. They can calculate the Apfel score and document it prominently in the patient record so that the anesthesia team and PACU staff can act upon it [7]. Evidence indicates that when nurses perform preoperative risk assessment using validated tools, the information directly informs care planning and facilitates the selection of appropriate prophylactic interventions [10]. The nurse's assessment should also capture modifiable risk factors—such as dehydration,

anxiety, and pain—that can be addressed before surgery to reduce baseline risk [11]. Patient education at this stage is equally important: explaining the risk factors and the rationale for prophylaxis can reduce anxiety and set realistic expectations, which itself may attenuate the subjective experience of nausea [11]. The nurse should also ensure that the risk score is communicated clearly during handover, because a high-risk score that is recorded but not acted upon offers little protection to the patient [10].

PACU and Postoperative Monitoring

The PACU is the epicenter of PONV identification. Nurses in this environment must assess for PONV at regular intervals as part of routine postoperative assessment, especially during the first 24 hours [12]. Early signs and symptoms include subjective nausea, pallor, swallowing, tachycardia, and an urge to vomit [12]. Because patients emerging from anesthesia may be drowsy or reluctant to complain, the nurse must actively inquire about nausea rather than waiting for the patient to report it [2]. A standardized PONV assessment scale—for example, 0 = no nausea or vomiting, 1 = nausea only, 2 = vomiting once, 3 = vomiting more than once—can facilitate consistent documentation and communication across shifts [12]. Continuous monitoring of vital signs and evaluation of the patient's response to interventions are integral components of PONV management [12]. The nurse must also distinguish PONV from other causes of postoperative distress, such as pain, hypovolemia, or opioid-induced sedation, and must recognize that unrelieved pain can exacerbate nausea [1]. The fourth consensus guidelines underscore that the PACU nurse is uniquely positioned to operationalize risk scores and to initiate rescue therapy promptly when prophylaxis fails [1]. Delays in treatment can allow nausea to progress to vomiting, which is more difficult to control and more distressing to the patient [2].

Documentation and Communication

Accurate documentation is the bridge between identification and action. Registered nurses are professionally and ethically obligated to assess PONV, record the findings, and act upon them [12]. Documentation should include the time of assessment, the severity of symptoms, the interventions administered, and the patient's response [12]. Standardized documentation tools—whether embedded in the electronic health record or on a paper observation chart—improve communication between staff and ensure continuity of care [12]. The nurse's record also provides the data necessary for quality improvement audits and for evaluating the effectiveness of PONV protocols [10]. Furthermore, documentation of risk status at the point of handover—from preoperative nurse to anesthesia provider, and from PACU nurse to ward nurse—ensures that high-risk patients are not lost in transitions of care [10]. When documentation is incomplete, opportunities for timely prophylaxis and rescue treatment are missed [12].

Nursing Management Strategies

Once PONV is identified—or, ideally, before it emerges—the nurse plays a central role in implementing management strategies. Contemporary practice emphasizes a multimodal approach that combines pharmacological prophylaxis with non-pharmacological adjuncts and addresses modifiable baseline risk factors [13].

Pharmacological Management and Multimodal Prophylaxis

Pharmacotherapy remains a cornerstone of PONV prevention and treatment, but its effectiveness depends on appropriate selection and timing [14]. The fourth consensus guidelines recommend that, because risk scores imperfectly predict PONV, one to two antiemetics should be administered to all surgical patients, with two- or three-drug regimens reserved for those at moderate or high risk [1]. Combination therapy is superior to monotherapy because it blocks multiple emetic pathways simultaneously and allows lower doses of each agent, thereby reducing adverse effects [13]. The major classes of antiemetics used in PONV management include 5-HT_3 receptor antagonists such as ondansetron, granisetron, and palonosetron; corticosteroids such as dexamethasone; NK_1 receptor antagonists such as aprepitant and fosaprepitant; dopamine antagonists such as metoclopramide and droperidol; anticholinergics such as scopolamine; and antihistamines such as dimenhydrinate [14]. Table 3 summarizes the mechanisms of action and representative agents for these classes. The nurse's role in pharmacological management includes administering prophylaxis at the correct time, monitoring for adverse effects such as QT prolongation with 5-HT_3 antagonists or hyperglycemia with dexamethasone, and administering rescue antiemetics from a class not used for prophylaxis when breakthrough PONV occurs [15]. Nurses must also advocate for opioid-sparing analgesic techniques, since opioids represent the strongest modifiable risk factor for PONV [16]. Multimodal analgesia incorporating NSAIDs, acetaminophen, regional anesthesia, ketamine, and lidocaine infusions can substantially reduce opioid requirements and,

consequently, PONV risk [16]. The nurse's assessment of pain and its management is therefore inseparable from PONV prevention [16].

Table 3. Classes of Antiemetic Agents Used in PONV Management

Drug Class	Mechanism of Action	Representative Agents	Nursing Considerations
5-HT_3 antagonists	Block central and peripheral serotonin type-3 receptors	Ondansetron, granisetron, palonosetron	Monitor for headache, fatigue, QT prolongation
Corticosteroids	Prostaglandin antagonism and anti-inflammatory effect	Dexamethasone	Monitor blood glucose; delayed antiemetic onset
NK_1 antagonists	Block substance P/neurokinin-1 receptors	Aprepitant, fosaprepitant	Monitor for headache, hiccups
Dopamine antagonists	Block dopamine D_2 receptors	Metoclopramide, droperidol	Monitor for extrapyramidal symptoms, sedation
Anticholinergics	Block muscarinic receptors	Scopolamine	Monitor for dry mouth, blurred vision
Antihistamines	Block histamine H_1 receptors	Dimenhydrinate	Monitor for sedation, dry mouth

Non-Pharmacological Interventions

Non-pharmacological interventions are low-risk, nurse-led strategies that can be integrated into PONV care to reduce symptom burden and antiemetic requirements [17]. Acupoint stimulation at the pericardium 6 (PC6) point, whether through acupressure wristbands or transcutaneous electrical acupoint stimulation, has been endorsed as an adjunct to pharmacological prophylaxis, particularly for patients at moderate-to-high risk [17]. Nurse-led aromatherapy—using essential oils such as lavender, peppermint, or ginger—has been implemented in PACU settings as a first-line or adjunctive treatment for breakthrough nausea, with evidence of feasibility, low cost, and patient acceptability [18]. Oral ginger intake has also been studied as a simple adjunct for nausea and vomiting, with systematic review evidence supporting its use in some surgical populations [19]. Gum chewing is another inexpensive nurse-led measure that may reduce vomiting by activating the oral–vagal reflex [20]. A meta-analysis of ginger for PONV supports its potential role as an alternative or adjunctive intervention, although evidence quality varies across studies [21]. The nurse's role is to select interventions judiciously, based on patient preference, surgical context, and available evidence, and to document their effect [17]. Importantly, non-pharmacological measures should not be used as a substitute for indicated pharmacological prophylaxis in high-risk patients, but rather as complementary strategies that empower nurses to act proactively and holistically [18]. Table 4 summarizes key nurse-led non-pharmacological interventions.

Table 4. Nurse-Led Non-Pharmacological Interventions for PONV

Intervention	Evidence of Effect	Practical Nursing Application
PC6 acupressure or acustimulation	Reduces PONV incidence and antiemetic use; endorsed as adjunct	Apply wristbands or devices preoperatively or in PACU
Aromatherapy (lavender, peppermint, ginger)	Reduces nausea severity; may reduce rescue antiemetic use	Offer inhalation or topical application for breakthrough nausea
Ginger consumption	Evidence supports benefit for nausea and vomiting in some populations	Provide ginger-containing foods or supplements when permitted
Gum chewing	May reduce vomiting; activates oral–vagal reflex	Offer sugarless gum postoperatively when safe
Head elevation	Reduces reflux and nausea	Position patient upright when hemodynamically stable

Music therapy	Small-to-moderate effect on nausea	Offer patient-preferred music via headphones
Patient education and supportive visits	Reduces anxiety and improves coping	Provide preoperative information and postoperative reassurance

Patient Education and Discharge Planning

The nurse's role in PONV extends beyond the hospital walls. Post-discharge nausea and vomiting (PDNV) is a significant concern, particularly for ambulatory surgery patients, in whom symptoms may persist for 48–72 hours or longer after discharge [22]. High-risk patients benefit from a predischarge PDNV risk assessment and an individualized plan that may include long-acting antiemetics, access to rescue medication at home, and clear instructions on when to seek help [22]. Patient education is a core nursing intervention in this context. Before discharge, the nurse should explain the possibility of PDNV, review the signs and symptoms that warrant medical attention—such as persistent vomiting, inability to tolerate fluids, or signs of dehydration—and provide practical self-care strategies [22]. These may include dietary modifications, starting with clear fluids and bland foods and avoiding fatty or spicy meals; positional measures such as remaining upright after meals; and the use of non-pharmacological adjuncts such as ginger or acupressure wristbands [19,22]. The nurse should also ensure that the patient has a follow-up plan—whether a telephone call or an outpatient visit—to monitor for PDNV and to provide reassurance [22]. In ambulatory settings, where the window for direct nursing observation is brief, education assumes heightened importance [22]. A patient who understands their risk and knows how to respond to early symptoms is better equipped to manage PDNV at home and less likely to require unplanned healthcare contact [22].

Organizational and Quality Improvement Initiatives

Individual nursing actions are most effective when embedded in a supportive organizational infrastructure. Nurse-led quality improvement initiatives have demonstrated that systematic PONV care can be implemented and sustained [23]. The fourth consensus guidelines provide a comprehensive evidence-based framework for PONV risk assessment, prophylaxis, and management, and earlier consensus statements helped establish the principle that PONV should be managed proactively rather than reactively [1,23]. Hospitals that have adopted nurse-led bundled evidence-based strategies—including Apfel scoring, aromatherapy, limited preoperative fasting, postoperative gum chewing, and PC6 acupressure—have reported increases in nurse knowledge and confidence, as well as incremental improvements in the use of evidence-based interventions [23]. However, implementation science reveals that changing practice is not straightforward. Barriers include time constraints, competing clinical priorities, lack of decision-support integration, and reliance on anecdotal rather than evidence-based interventions [23]. Successful initiatives have employed unit-based change champions, nursing education, pre- and post-implementation chart audits, visual reminders, and integration of PONV assessment into the electronic health record [10,23]. The nurse's role in organizational management includes participating in protocol development, advocating for resources such as aromatherapy supplies or acupressure bands, and contributing to audit and feedback cycles [23]. When nurses are empowered to lead PONV quality improvement, the result is a shift from reactive, individual-based management to proactive, system-wide prevention—a shift that aligns with the principles of enhanced recovery after surgery and patient-centered care [1,23].

Special Populations and Considerations

While the principles of PONV management are broadly applicable, certain populations require tailored nursing approaches. Pediatric patients are at particular risk for postoperative vomiting, with risk factors including age greater than 3 years, history of motion sickness or postoperative vomiting, and high-risk status in post-pubertal girls [24]. The incidence of PONV in children is greatest after tonsillectomy, and the added risk for each additional risk factor is substantial, reinforcing the need for pediatric-specific risk assessment [24]. Nurses caring for children must use age-appropriate non-pharmacological interventions, such as distraction, parental presence, and flavored oral antiemetics, and must monitor hydration closely because children are more vulnerable to fluid deficits [24]. Ambulatory surgery patients present a different challenge: the duration of direct nursing observation is short, and the risk of PDNV is substantial [22]. Nurses in ambulatory settings must prioritize predischarge risk assessment, patient education, and follow-up planning [22]. Patients undergoing laparoscopic and gynecological procedures are at elevated risk because of the nature of the surgery and the frequent use of opioids; nurse-led non-pharmacological interventions, including PC6 acupressure and structured enhanced-recovery pathways, have shown particular promise in these populations [17]. Finally, patients with a history of PONV or motion sickness require heightened vigilance, as these are among

the strongest predictors of subsequent episodes [7]. For all special populations, the common thread is the nurse's responsibility to individualize assessment and intervention rather than applying a uniform protocol without regard to patient-specific factors [24].

CONCLUSION

Nurses play a critical role in the early detection and management of postoperative nausea and vomiting (PONV). They assess patients' risk profiles, observe initial nausea signs, implement interventions, and educate patients post-discharge. Research shows that PONV can be prevented and managed through systematic risk stratification and multimodal interventions. Tools like the Apfel risk score enhance communication, but their success relies on consistent nurse application. Effective PONV care combines pharmacological measures with non-pharmacological therapies and patient education. Future focus should be on standardizing protocols, expanding research on non-pharmacological strategies, and ensuring nurses have the necessary support to improve patient outcomes and advance nursing practice.

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