

Advantages of Intravenous Administration of Amisulpride Over Ondansetron for Prophylaxis of  
Postoperative Nausea and Vomiting: An Educational Module

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## Abstract

**Title:** Advantages of Intravenous Administration of Amisulpride Over Ondansetron for Prophylaxis of Postoperative Nausea and Vomiting: An Educational Module

**Impact Statement:** In patients undergoing general anesthesia, the administration of intravenous amisulpride has proven to be effective in preventing Post Operative Nausea and Vomiting (PONV) while having a safer profile when compared to ondansetron.

**Background:** PONV is, after pain, the second most frequent complaint after surgery, and it may contribute to severe complications, decrease patient satisfaction, extend the hospital stay and increase healthcare costs.<sup>1-6</sup> Despite the potential for serious side effects, ondansetron remains the preferred drug used to prevent PONV.<sup>5</sup>

**Objective:** This project aims to compare the effectiveness and safety profile of ondansetron and amisulpride as a prophylaxis for PONV and present the findings through an educational module to anesthesia providers and assess the degree of knowledge gained.

**Method:** We conducted a literature review comparing amisulpride and ondansetron as prophylactic agents for PONV. We created an online educational module to present to anesthesia providers and a pre and post surveys to assess the degree of knowledge acquired. The project was developed in a large level 1 trauma center, using anonymous and online platform for survey and module delivery and data collection.

**Results:** We found amisulpride to be effective as a prophylactic drug for PONV; it also decreases the severity of nausea in the high-risk patient. Amisulpride has a safer profile and fewer potential for side effects when compared to ondansetron.

**Discussion:** Data from surveys shows anesthesia providers increased their knowledge about PONV and effective prophylaxis treatments after the educational module. Small sample size, short duration of this project, and the use of online platform were limitations of this project.

**Conclusion:** The educational module improved anesthesia providers' knowledge and attitude about Postoperative Nausea and Vomiting and the administration of intravenous amisulpride as an effective and safe prophylactic alternative.

*Keywords:* Postoperative Nausea and Vomiting, Prophylaxis, Prevention, Ondansetron, Amisulpride, Postoperative Care

# **Advantages of Intravenous Administration of Amisulpride Over Ondansetron for Prophylaxis of Postoperative Nausea and Vomiting: An Educational Module**

## **I. Introduction**

### **Problem Identification**

In addition to pain, Postoperative Nausea and Vomiting (PONV) is the second most common complaint after a surgical procedure. Nausea is an unpleasant sensation referred to as a desire to vomit without the muscular movement that produces expulsion, while vomiting is the act of expelling the gastric content.<sup>1</sup> PONV is a distressing and frequent complication after surgical procedures under anesthesia. It may contribute to dehydration, electrolyte abnormalities, delayed wound healing and dehiscence, pulmonary aspiration of gastric content, and extended hospital stay.<sup>2</sup>

Despite the widespread use of short-acting anesthetic agents, antiemetic drugs as prophylaxis, and minimally invasive procedures, PONV still affects about 20% to 30% of surgical patients. It could be as high as 80% in high-risk patients.<sup>3</sup> One reason for the high incidence of PONV is the increased number of ambulatory surgical procedures.<sup>3</sup> There is an extensive repertoire of literature supporting strategies to prevent PONV, but the optimal recommendation has not been established.<sup>2</sup>

PONV is a multifaceted physiologic event including several pathophysiologic mechanisms. The primary control of nausea and vomiting comes from the vomiting center, located in the medulla. Five main receptor pathways are involved in the means of PONV: reflex afferent pathways from the cerebral cortex, neuronal pathways from the vestibular system, the chemoreceptor triggering zone, midbrain afferents, and the vagal mucosal track in the gastrointestinal system. The vomiting center could be activated by stimulating any of these

afferent pathways via serotonergic receptors, dopaminergic, cholinergic (muscarinic), or histaminergic stimulation can activate the vomiting center.<sup>3</sup>

Gene aberrations can also increase the incidence of PONV incidence and influence the response to prophylaxis or rescue treatment. The deletion of AAG in 5-HT<sub>3B</sub> receptor gene and polymorphism on the A2A2 allele of the dopamine D<sub>2</sub> receptor increases the frequency and magnitude of PONV. In the presence of a phenotype of a rapid metabolizer, there is a higher incidence of postoperative vomiting.<sup>4</sup>

## **Background**

PONV is a secondary discomfort attributed to surgery, as the pain remains a frequent complaint after surgery. The following complications appear to result from PONV: wound dehiscence, fluid and electrolyte imbalances, pneumothorax, pulmonary aspiration, subcutaneous emphysema, esophageal lesions, excessive tension in the suture line, and high intracranial pressure.<sup>5</sup> The occurrence of complications is related to the duration of PONV, as this may occur during the first 24 hours postoperatively, lasting for up to 3 days after the procedure was finished.<sup>6</sup>

The risk factors of PONV include female gender, patients less than 50 years old, gravidity, history of PONV or motion sickness, a body mass index less than 25 kg/m<sup>2</sup>, nonsmoking patients, laparoscopic surgeries, procedures lasting  $\geq 1$  hour, and type of surgery.<sup>5</sup> PONV seems to be related to general anesthesia, intravenous patient-controlled analgesia and inhalational agents like enflurane or nitrous oxide, and administration of cholinergic or opioid formulations.<sup>5</sup> The administration of opioids, intraoperatively or postoperatively, is linked to a two to four times higher incidence of PONV. Multimodal analgesia, including non-opioid

drugs, decreases the risk considerably for PONV. The incidence of PONV increases exponentially as more risk factors of PONV are present in the same patient.<sup>7</sup>

Enflurane and isoflurane are not used as much nowadays with the increasing use of desflurane and sevoflurane, but preliminary studies have analyzed the impact on PONV when desflurane or sevoflurane are administered.<sup>8</sup> There is no consensus about the magnitude of symptoms concerning some risk factors like smoking, age, or length of surgery.<sup>8</sup> Risk scores that apply in adults are not typically applicable in children. An alternative classification is known as the Eberhard classification. It identifies predictors for PONV, which include: the duration of the procedure longer than 30 minutes; children older than 3 years old; previous history of the PONV in child, parent, or siblings; and strabismus surgery.<sup>8</sup> One point is given for each risk factor, resulting in 0, 1, 2, 3, or 4 points, predicting the risk for PONV from 9% to up to 70%.<sup>9</sup>

The incidence of PONV in young children is minimal but increases significantly in adolescents, in which the incidence surpasses that for adults. The type of procedure also plays a role in the incidence of PONV. The most significant incidence seen is seen in children undergoing hernia repair, strabismus repair, orchiopexy, microtia, tonsillectomy, and middle ear surgeries. There are no significant differences between genders before puberty; PONV is experienced in females more than in males after puberty.<sup>10</sup>

Most antiemetic drugs target one or more of the receptors activated in the mechanism of nausea. This includes serotonin, opioid, histamine, dopamine, and muscarinic. Patients with minor risk factors benefit from prophylaxis based on preference, cost-related factors, and risk/benefit ratio. Patients at moderate and higher risks are benefited from the prevention of PONV using at least 2 antiemetics. It is also valuable for the administration of Total Intravenous Anesthesia (TIVA) with propofol and opioid-sparing formulations.<sup>5</sup> A combination of

antiemetics is used; drugs acting in different receptors seem to improve the efficacy of the therapy.<sup>5</sup>

An additive result in reducing the incidence of PONV can be achieved by combining different class antiemetics.<sup>11</sup> Other recommendations combine pharmacologic and nonpharmacologic options, and to decrease severity or eliminate modifiable factors. The use of propofol, when compared to volatile anesthetics, reduces the incidence of postoperative nausea and vomiting by 19%. The abstention from nitrous oxide additionally reduced the incidence of PONV by 12%.<sup>12</sup>

Current guidelines on the management of PONV recommend risk-oriented, prophylactic modalities based on predictive models, considering unnecessary costs and potential side effects, in contrast to prescribing multiple agents to all patients. Although several prediction models are well researched and frequently used, their practical impact is still being doubted since the occurrence of PONV is still high despite the use of prophylactic agents.<sup>13</sup>

### **Scope of the Problem**

Every year, about 20 million people suffer PONV around the globe. PONV and pain are the 2 most common problems after surgery under anesthesia. Adult patients frequently rate PONV as worse than pain. Many studies concluded that the incidence of PONV is highest in the first 6 hours after the surgical procedure is completed.<sup>14</sup> PONV is the principal reason for unplanned hospital admission, extended hospital stays, and higher overall costs.<sup>15</sup> It is also significant the high level of discomfort and dissatisfaction in a from a patient suffering from PONV.<sup>16</sup>

## **Consequences of the Problem**

The magnitude of PONV varies from resource use to the significant physical and psychosocial consequences on the patient. Direct and indirect costs are both increased with the evidence of PONV in the surgical patient.<sup>17</sup> Furthermore, the human component is essential for most illnesses. From a hospital's evaluation, the magnitudes of PONV are directly related to the patient's length of stay and resource utilization. From the patient's point of view, the impact of nausea and vomiting is significant during the postoperative recovery period and after discharge in case of an outpatient encounter. PONV is unpleasant for the patient and includes the debilitating component of the operation itself.<sup>18</sup>

Evidence-based guidelines encourage the use of pharmacological prophylaxis in patients at risk of PONV. These guidelines provide recommendations on identifying high-risk patients, managing baseline PONV risks, making choices for prevention and rescue treatment of PONV, and offering suggestions for the institutional implementation of a PONV protocol.<sup>19</sup> Ondansetron remains the drug of choice for the prevention and treatment of PONV.<sup>5</sup>

Ondansetron hydrochloride is a selective inhibitor of type 3 serotonin receptors or 5-HT<sub>3</sub> receptors. It is preferred over other antiemetics by most anesthesia providers. When used as a prophylaxis of PONV in adults, a 4 mg intravenous dose is recommended at least 30 minutes before emergence from anesthesia. The half-life of ondansetron is usually about 4 hours; therefore, it is recommended to administer it towards the end of the surgical procedure.<sup>5</sup> Most common side effects include headache, dizziness, diarrhea, elevated liver enzymes, and constipation. Ondansetron is associated with QTc segment elongation and the potential increased risk of cardiac arrest and arrhythmia.<sup>19</sup>

## **Knowledge Gaps**

In 2020, the International Anesthesia Research Society released the Fourth Consensus Guidelines for the management of PONV.<sup>9</sup> In this edition, multimodal prophylaxis is recommended with 2 or more methods. These recommendations are proposed due to the inadequate prevention and the availability of antiemetic safety data. Ondansetron was proven to be less efficacious than ramosetron, granisetron, palonosetron, aprepitant, and fosaprepitant. Despite these facts, ondansetron continues to be the first choice, even when superior drugs are available.<sup>9</sup>

While the efficacy of an intervention is reliable, effectiveness is influenced by institutional compliance. Despite the efforts to widely adopt PONV management guidelines, its implementation is insufficient in both adult and pediatric populations.<sup>20,21</sup> Prompt management of PONV requires constant vigilance. Still, it has been demonstrated that PONV symptoms are often neglected, especially nausea. It has been documented that only 42% of postoperative nausea and vomiting occurrences were acknowledged in the anesthesia care unit, and 29% were diagnosed in the surgical team.<sup>22</sup>

## **Proposal Solution**

In February 2020, the Food and Drug Administration (FDA) approved Barhemsys® (amisulpride), from Acacia Pharma, as a prophylaxis and rescue treatment of PONV due to its favorable results in clinical trials.<sup>23</sup> Amisulpride is a dopamine D2, D3 receptors antagonist. Amisulpride 5 mg intravenously was found to be more effective than placebo in achieving a complete response and reducing the severity of nausea.<sup>9</sup> Administration of amisulpride has been associated with a mild increase in levels of prolactin, but the clinical importance remains unclear.

A standard antiemetic dose of amisulpride is not associated with sedation, extrapyramidal side effects, or QTc prolongation.<sup>24, 25, 26, 27</sup>

When intravenous amisulpride is given at induction of anesthesia in combination with a standard antiemetic significantly decreases the incidence of PONV in a population of patients at high risk of PONV undergoing a broad range of surgeries under general anesthesia using volatile agents.<sup>24,25</sup> Amisulpride, when used in combination with other class antiemetics, is well-tolerated and has similar results compared to placebo in respect of safety profile.<sup>25</sup> The effectiveness of amisulpride as prophylaxis for PONV is higher when combined with dexamethasone than with ondansetron.<sup>25</sup>

### **Rationale and Objective**

To date, there is little information about studies directly comparing the efficacy of ondansetron and amisulpride through randomized controlled trials. Nonetheless, there are multiple randomized controlled trials comparing ondansetron to placebo and amisulpride to placebo in similar populations, giving conclusive results on its effects as prophylaxis for PONV. This literature review aims to investigate previous research on ondansetron and amisulpride, individually compared to placebo, and gather statistically significant data to establish an adjusted indirect comparison.<sup>28</sup>

## **II. Literature Review**

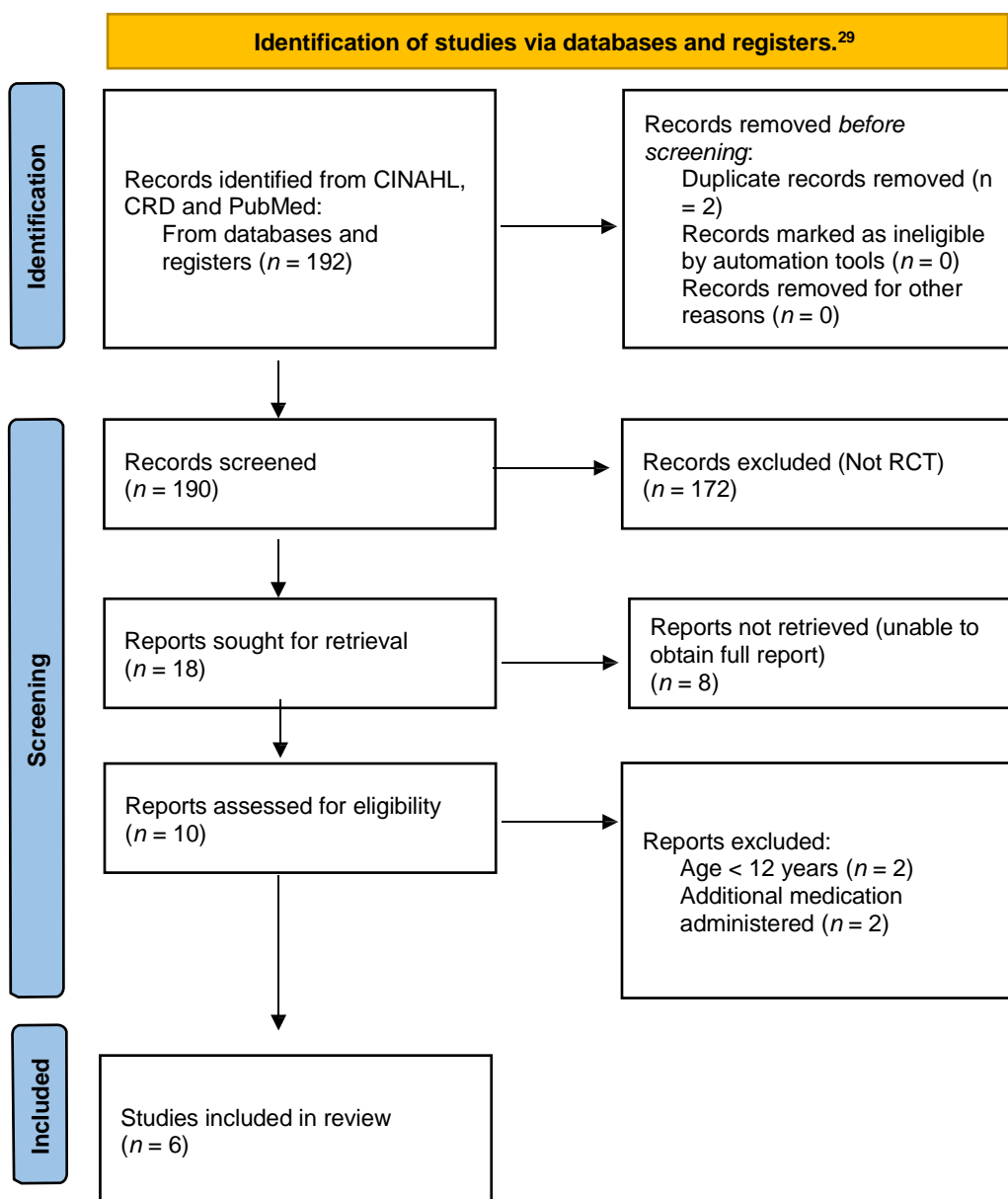
### **Eligibility Criteria**

Using inclusion and exclusion criteria, randomized controlled trials (RCT) were selected. Inclusion criteria included only English written RCT, studying the effectiveness of either Ondansetron or Amisulpride for prevention of PONV and compared to placebo. Exclusion criteria included the studies where subjects were younger than 12 years of age, with preexisting

nausea and vomiting 24 hours before the surgical procedure. Studies focused on prophylaxis of PONV and the effect of drugs in the first 24 hours after the surgical procedure. Library services at Florida International University (FIU) were used to access the database sources used for this literature review.

### Information Sources

The Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Cochrane Review Database (CRD), and PubMed were used as search tools. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guided this literature review.<sup>29</sup>



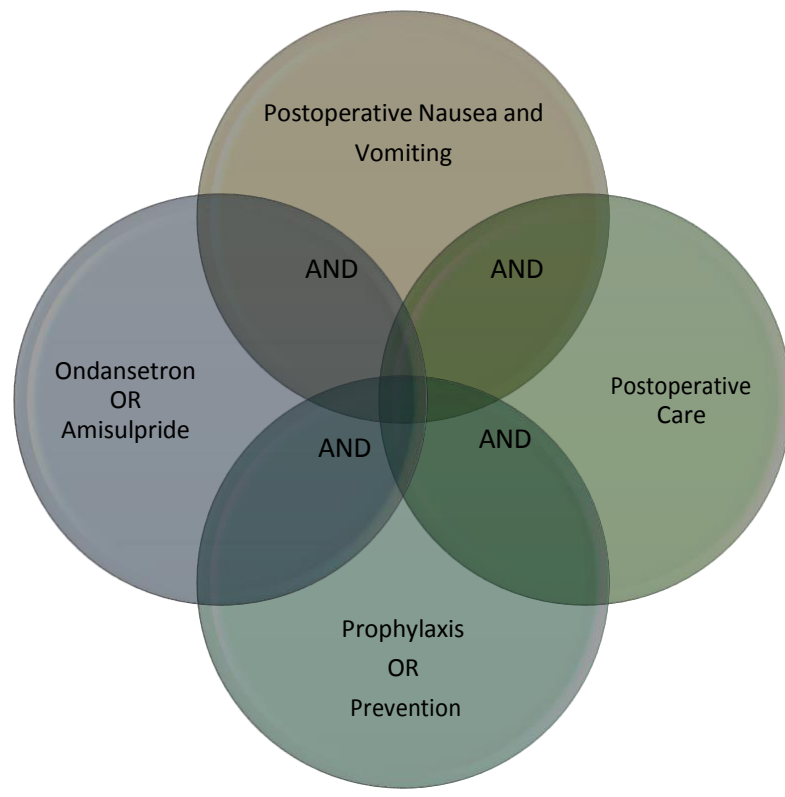
### Search Strategy

Initially, 192 articles were identified. The search was refined to studies either comparing ondansetron to placebo or amisulpride to placebo. Studies where the administration of ondansetron was different than 4 mg were excluded. Studies where the administration of amisulpride was other than 5 mg were excluded. The search was limited to studies measuring the effectiveness of either ondansetron or amisulpride for preventing PONV in the initial 24 hours of the postoperative period. Following these inclusion and exclusion criteria, 6 articles remained and were analyzed.

### Keywords

Based on the PICOT question, these search keywords were identified: postoperative nausea and vomiting, prophylaxis, prevention, ondansetron, amisulpride, and postoperative care.

**Figure 1.** Search Keywords



## Study Characteristics

Through the literature review, necessary data was collected from randomized controlled trials, either comparing the effectiveness of ondansetron compared to placebo or amisulpride compared to placebo in similar populations. Then, the data was used to establish an indirect comparison. This method compares the effectiveness of two medications (ondansetron and amisulpride) relative to a mutual comparator (placebo), which will associate these drugs.<sup>28</sup>

## Results

The articles analyzed in this literature review evaluated the effect of the drug as prophylaxis for PONV. The result of ondansetron on preventing PONV was investigated by So et al.<sup>30</sup>, Kovak et al.<sup>31</sup>, and McKenzie et al.<sup>32</sup>. In contrast, the impact of amisulpride on preventing PONV was investigated by Kranke et al.<sup>24,25</sup> and Gan et al.<sup>26</sup>. All the studies are prospective, double-blind, randomized controlled trials.<sup>24-26,30-32</sup> All the studies constitute evidence level I.<sup>33</sup>

In an investigation by So et al.,<sup>30</sup> the authors randomized 68 patients to receive either a single intravenous dose of 4 mg of ondansetron prior to extubation (36 patients) or no prophylaxis (32 patients). An independent observer used a visual analog score to assess nausea and vomiting for 24 hours after the surgical procedure. This study showed no difference between the ondansetron (n = 36) and control (n = 32) groups. In the first two hours of the postoperative period, two patients (6%) treated with ondansetron and one patient (3%) from the control group experienced vomiting. At 24 hours, 5 patients (14%) were treated prophylactically with ondansetron, and 6 patients (19%) from the control group vomited.<sup>30</sup>

Ten patients treated with ondansetron and 11 patients in the control group required rescue treatment with antiemetic before discharge. The length of hospital stay and satisfaction rate was similar between the two groups.<sup>30</sup> Comparing these two groups, the occurrence of vomiting in

the first 24 hours decreased by 5% in the group that received ondansetron as prophylaxis.<sup>30</sup> The authors concluded that the routine administration of ondansetron does not reduce the occurrence of PONV after laparoscopic cholecystectomy.<sup>30</sup>

Kovac et al.<sup>31</sup> conducted a multicenter, stratified study that analyzed 467 male patients randomly treated with ondansetron, 4 mg intravenously (n = 242) or placebo (n = 225). The complete responsibility for this study was defined as no emesis.<sup>31</sup> In the initial 2 hours of the postoperative period, 71 patients (31%) of the ondansetron group did not experience nausea, compared to 63 patients (26%) in the placebo group. In the same period, 88 patients (39%) treated with ondansetron remained vomit-free, compared to 63 patients (26%) in the placebo group. In the overall 24-hour period, 59 patients treated with ondansetron (26%) did not complain of nausea compared to 49 patients (20%) from the placebo group. At the end of the 24-hour period, 80 patients (35%) did not have any emetic episode in the group treated with ondansetron, while in the placebo group, 63 patients (26%) remained emesis free.<sup>31</sup>

The authors concluded that 4 mg of intravenous ondansetron prevents emesis effectively in the male population. In the first 2 hours of the postoperative period, ondansetron reduced nausea by 5% and vomiting by 6%. After an initial 24-hour period, the overall incidence of nausea with ondansetron was decreased by 6%, while emesis was reduced by 9%.<sup>31</sup>

A prospective study by McKenzie et al.<sup>32</sup> included 580 women, randomly assigned to 4 groups, and given ondansetron intravenously, 1 mg, 4 mg, 8 mg, and placebo. In this study, the nurse asked the patient about the presence and severity of nausea and evaluated the objective existence of an emetic episode. A data entry card was provided to the patient at discharge to record nausea and emesis data, and cards were mailed back to the researcher.<sup>32</sup>

In the postoperative period, 30% of patients in the placebo group ( $n = 139$ ) did not experience nausea, while 40% of the patients treated with ondansetron 4 mg ( $n = 136$ ) remained nausea-free for the same period. Similarly, 64 patients (77%) from the placebo group did not have emesis or rescue treatment before discharge. They experienced no vomiting over the next 22 hours, compared to 103 patients (90%) from the ondansetron 4 mg group, without any vomiting episode. The authors of this investigation conclude with the statement that ondansetron 4 mg prevents nausea and vomiting. In this study, when 4 mg of intravenous ondansetron is administered, nausea and vomiting are reduced by 10% and 13%, respectively, in the first 24 hours.<sup>32</sup>

Gan et al.<sup>26</sup> conducted two identical placebo-controlled and parallel-group phase III studies to evaluate the efficacy of intravenous 5 mg of amisulpride in preventing PONV in the adult post-surgical patient, where 689 patients were initially chosen for the administration of intravenous amisulpride (5 mg) or equivalent to placebo; a total of 626 were evaluated, once 63 subjects were excluded. All the patients included in the studies have two or more risk factors for PONV.<sup>26</sup>

During the first 24-hour period, 164 patients (52.1%) of the amisulpride pooled group reported nausea, compared to 195 (62.7%) from the placebo pooled group. During the same period, 68 patients (21.6 %) from the amisulpride group experienced emesis, while 81 patients (26%) from the placebo group remained emesis-free.<sup>26</sup> The authors agree with the conclusion that 5 mg of intravenous amisulpride effectively reduces the incidence of PONV, while data shows reduced nausea and vomiting by 10% and 4%, respectively, in the first 24 hours, in patients with 2 or more risk factors.<sup>26</sup>

A multicenter trial was conducted by Kranke et al.<sup>25</sup> in 1,147 patients with at least 3 risk factors for PONV. Patients randomly received 5 mg of intravenous amisulpride (572 patients) or placebo (575 patients), with well-balanced characteristics between these 2 groups. This placebo-controlled trial took place in 29 countries and was registered on ClinicalTrials.gov. This study was planned by the authors and Acacia Pharma Ltd. Clinical practice standards were followed.<sup>25</sup>

After 24 hours after surgery, 330 patients (57.7%) of the group receiving amisulpride did not experience any nausea and vomiting (complete response), compared to 268 patients (46.6%) from the placebo group. There was an 11% reduction in the occurrence of PONV between them. The study shows that 5 mg intravenous amisulpride prevents PONV.<sup>25</sup>

Kranke et al.<sup>24</sup> conducted a study on 223 patients, randomized into four groups to receive amisulpride 1 mg, 5mg, 20 mg, and placebo. This parallel-group study was conducted at ten international sites, including the United States. The trial was registered at EudraCT and ClinicalTrials.gov. All the patients have two or more risk factors for PONV. A total of 215 patients were analyzed as protocol after eight candidates were excluded from the study.<sup>24</sup>

From the amisulpride 5 mg group ( $n = 50$ ), 14% of the patients experienced PONV in the 24-hour postoperative period, compared to 69% of patients from the placebo group ( $n = 54$ ); this shows a reduction of PONV by 29% when amisulpride 5 mg was administered intravenously.<sup>24</sup> The incidence of vomiting decreased from 35% (placebo group) to 14% (with amisulpride 5 mg), for a 21% reduction. Similarly, nausea was reported in 72% receiving placebo, while 44% of patients receiving amisulpride 5 mg intravenously reported any nausea, for a 27% reduction after administration of amisulpride.<sup>24</sup> The authors believe this study demonstrates a significant benefit of amisulpride 5 mg intravenously for reduction of incidence of PONV.<sup>24</sup>

Author(s)	Purpose	Methodology/ Research Design	Sampling/Setting	Primary Results	Relevant Conclusions
<b>So et al.,<sup>30</sup> 2002</b>	To analyze the efficacy of intravenous ondansetron for prophylaxis of Postoperative Nausea and Vomiting (PONV) after laparoscopic cholecystectomy	Prospective, Double-blind, Randomized Controlled Trial (RCT). Level of Evidence I.	68 adult patients received either 4 mg of intravenous ondansetron (36 patients) or placebo (32 patients). Patient's age was 21 to 82. Patients were ASA physical status I or II.	During the first 2 hours after surgery, 2 patients (6%) from the ondansetron group and 1 patient (3%), from the control group, experienced vomiting. At 24 hours, 5 patients (14%) were treated prophylactically with ondansetron, and 6 patients (19%) from the control group vomited.  10 patients treated with ondansetron and 11 patients in the control group required rescue treatment with antiemetic before discharge. The length of hospital stay and satisfaction rate was similar between the 2 groups.	The study concluded that the administration of intravenous (4 mg) of ondansetron does not decrease incidence of PONV.
<b>Kovac et al.,<sup>31</sup> 1996</b>	To study the efficacy and safety of ondansetron in preventing PONV in male outpatients	Prospective, Multicenter, Stratified, RCT. Level of Evidence I.	467 male outpatient, 12 year and older. 242 patients received ondansetron 4 mg intravenously.	In the initial 2 hours of the postoperative period, 71 patients (31%) of the ondansetron group did not experience nausea, compared to 63 patients (26%) in the placebo	The authors concluded that 4 mg of intravenous ondansetron prevents emesis effectively in male population. In the first 2 hours of the

			<p>225 patients received the equivalent to placebo. This multicenter study was developed through 24 medical centers. Patients were ASA physical status I or II.</p>	<p>group. In the same period, 88 patients (39%) treated with ondansetron remained vomit-free, compared to 63 patients (26%) in the placebo group. In the overall 24-hour period, 59 patients treated with ondansetron (26%) did not complain of nausea compared to 49 patients (20%) from the placebo group. At the end of the 24-hour, 80 patients (35%) did not have any emetic episode in the group treated with ondansetron, while in the placebo group, 63 patients (26%) remained emesis free</p>	<p>postoperative period, ondansetron reduced nausea by 5% and vomiting by 6%. After initial 24-hour period the overall incidence of nausea with ondansetron was decreased by 6%, while emesis was reduced by 9%.</p>
<p><b>McKenzie et al.,<sup>32</sup> 1993</b></p>	<p>To study the efficacy of ondansetron for prophylaxis of PONV in women undergoing ambulatory gynecologic surgery</p>	<p>Prospective, Double-blind, Randomized Controlled Trial (RCT). Level of Evidence I.</p>	<p>580 patients received either ondansetron intravenously (<math>n = 438</math>) or intravenous equivalent to placebo (<math>n = 142</math>).</p> <p>68 adult patients received either 4 mg of intravenous ondansetron (36</p>	<p>In the postoperative period, 30% of patients in the placebo group (<math>n = 139</math>) did not experience nausea, while 40% of the patients treated with ondansetron 4 mg (<math>n = 136</math>) remained nausea-free for the same period. Similarly, 64 patients (77%) from the placebo group did not have emesis or rescue treatment before discharge. They</p>	<p>The authors of this investigation conclude with the statement that ondansetron 4 mg prevents nausea and vomiting. In this study, when 4 mg of intravenous ondansetron is administered, nausea and vomiting are reduced by 10 and</p>

			patients) or placebo (32 patients). Patients were between 18- and 70-year-old. Patients were ASA physical status I or II.	experienced no vomiting over the next 22 hours, compared to 103 patients (90%) from the ondansetron 4 mg group, without any vomiting episode.	13%, respectively, in the first 24 hours.
<b>Gan et al.,<sup>26</sup> 2017</b>	To evaluate the efficacy of intravenous amisulpride in the prevention of PONV in adult surgical patients	2 identical and concurrent, Prospective, Randomized, Double-blind, Placebo-controlled Trials. Level of Evidence I.	689 patients were randomized to receive either 5 mg of amisulpride intravenously ( $n = 345$ ) or placebo ( $n = 344$ ). Age ranged between 18 and 88 years.	During the first 24-hour period, 164 patients (52.1%) of the amisulpride pooled group reported nausea, compared to 195 (62.7%) from the placebo pooled group. During the same period, 68 patients (21.6 %) from the amisulpride group experienced emesis, while 81 patients (26%) from the placebo group remained emesis-free.	The authors agree with the conclusion that 5 mg of intravenous amisulpride effectively reduce the incidence of PONV, while data shows a reduced nausea and vomiting by 10 and 4%, respectively, in the first 24 hours, in patients with 2 or more risk factors.
<b>Kranke et al.,<sup>25</sup> 2018</b>	To analyze the efficacy of intravenous amisulpride in the prevention of PONV in adult surgical patients at high risk	International, Multicenter, Prospective, Double-blind, Randomized, Placebo-controlled Trial. Level of Evidence I.	1147 patients with at least 3 PONV risk factors received either 5 mg of intravenous amisulpride ( $n = 572$ ) or placebo ( $n = 575$ ). Patients were, at least, 18-year-old.	After 24 hours after surgery, 330 patients (57.7%) of the group receiving amisulpride did not experience any nausea and vomiting (complete response), compared to 268 patients (46.6%) from the placebo group. There was an 11% reduction in the occurrence of PONV	The authors concluded that 5 mg of intravenous amisulpride is safe and efficacious for the prevention of PONV, in high-risk patients for PONV.

			The trial took place in 29 countries.	between them. The study shows that 5 mg intravenous amisulpride prevents PONV.	
<b>Kranke et al.,<sup>24</sup> 2013</b>	To evaluate the efficacy of intravenous amisulpride in the prevention of PONV in adult surgical patients	Prospective, Randomized, Double-blind, Placebo-controlled, Multicenter Trial. Level of Evidence I.	223 adult patients were randomized to receive either amisulpride intravenously ( $n = 168$ ) (in doses of 1, 5, and 20 mg) or placebo ( $n = 55$ )	From the amisulpride 5 mg group ( $n = 50$ ), 14% of the patients experienced PONV in the 24-hour postoperative period, compared to 69% of patients from the placebo group ( $n = 54$ ); this shows a reduction of PONV by 29% when amisulpride 5 mg was administered intravenously. <sup>13</sup> The incidence of vomiting decreased from 35% (placebo group) to 14% (with amisulpride 5 mg), for a 21% reduction. Similarly, nausea was reported in 72% receiving placebo, while 44% of patients receiving amisulpride 5 mg intravenously reported any nausea, for a 27% reduction after administration of amisulpride.	The authors believe this study demonstrates a significant benefit of amisulpride 5 mg intravenously for reduction of incidence of PONV.

## Discussion/Summary of Evidence

Since its approval by the FDA on October 31, 1997, ondansetron has been administered in various formulations and dosages to prevent and treat nausea and vomiting.<sup>34</sup> Prevention of PONV is one of the most common ondansetron uses and is currently the most frequently prescribed medication for this postoperative complication.<sup>35</sup> The administration of 5 mg intravenously remains the most accepted and often used dose of ondansetron, before emergence from anesthesia, when used as prevention of PONV.<sup>35</sup>

Despite the widespread use of ondansetron, So et al.<sup>30</sup> did not find significant differences in preventing PONV compared to placebo in the first 24 hours. Still, during the first two hours after surgery, the occurrence of vomiting was reduced by 5% when ondansetron was administered.<sup>30</sup> Kovak et al.<sup>31</sup> also compared ondansetron to placebo, demonstrating the drug's effect by decreasing the occurrence of nausea and vomiting in two hours after the surgical procedure by 5% and 6% respectively, while in the 24 hours, nausea and vomiting were reduced by 6 and 9% respectively.<sup>20</sup> McKenzie et al.<sup>21</sup> also investigated the effect of ondansetron 4 mg intravenously and compared it to placebo, concluding with the statement ondansetron lowers the frequency of nausea and vomiting by 10% and 13%, respectively, in the first 24 hours.<sup>32</sup>

Commercialization and administration of amisulpride started in February 2020 after its approval by the FDA. Its safety profile and effectiveness for prophylaxis of PONV impulse its adoption by anesthesia providers working towards an enhanced recovery after surgery, preventing the negative feelings with PONV, its complications, and increasing patient satisfaction.<sup>35</sup> Its cost-effectiveness also determines its success in the U.S. healthcare system, where most institutions prefer to administer more profitable formulations.<sup>36</sup>

In their study, Gan et al.<sup>26</sup> found a reduction of nausea and vomiting by 10% and 4%, respectively, in the first 24 hours when amisulpride 5 mg intravenously was administered before the emergence of anesthesia when compared to placebo.<sup>26</sup> Kranke et al.<sup>25</sup> also investigated the effectiveness of intravenous amisulpride compared to placebo, lowering by 11% the overall incidence of PONV in 24 hours.<sup>25</sup> In another randomized placebo-controlled trial, Kranke et al.<sup>24</sup> found a decrease in the occurrence of overall PONV in 24 hours by 29% after administration of intravenous amisulpride. While individually, nausea and vomiting were reduced by 27% and 35%, respectively, during the same 24-hour period.<sup>24</sup>

### **Conclusions**

PONV not only represents an unpleasant experience and complication from a surgical procedure, but it can negatively influence the patient's physical and mental recovery. Anesthesia providers employ various measures to prevent PONV, including the administration of an antiemetic or the combination of more than one. Ondansetron is currently the most prescribed antiemetic for the prevention of PONV. Ondansetron is proven to reduce the incidence of PONV, but several side effects are associated with its administration, with the most common being headache, dizziness, diarrhea, raised liver enzymes, and constipation. Ondansetron is associated with QTc segment elongation, and the potential increased risk of cardiac arrest and arrhythmia.<sup>39</sup>

Amisulpride 5 mg intravenously is efficacious as prophylaxis for PONV and reducing the seriousness of nausea and vomiting.<sup>12</sup> Its administration causes a minor raise in levels of prolactin, with unclear clinical importance; at a standard dose, it does not cause mental status changes, extrapyramidal symptoms, or QTc interval elongation.<sup>24-27</sup> When intravenous amisulpride is administered after induction of anesthesia, combined with another antiemetic, the

occurrence of PONV was significantly decreased high-risk patients, undergoing surgical procedures with administration of volatile anesthetics.<sup>24,25</sup>

### **III. Purpose and PICO Clinical Question**

#### **Purpose**

The purpose of this project was to create and present an educational module to anesthesia providers about the advantages of intravenous administration of amisulpride over ondansetron, for the prevention of postoperative nausea and vomiting.

#### **PICO Clinical Question**

In patients undergoing surgery under general anesthesia (P), what is the effect of intravenous amisulpride (I) compared to ondansetron (C) on preventing postoperative nausea and vomiting (O)?

Population (P): Patients undergoing surgery under general anesthesia

Intervention (I): Intravenous amisulpride

Comparison (C): Ondansetron

Outcomes (O): Prevention of postoperative nausea and vomiting

### **IV. Conceptual Underpinning and Theoretical Framework**

#### **Goals and Outcomes**

The SMART model will guide the goals and outcomes of this program. The objectives must be specific, measurable, achievable, relevant, and time-based as a measure of significance, feasibility, and quality.<sup>37</sup>

#### ***Specific***

Anesthesia providers will participate in an evidence-based educational module discussing the etiology, risk factors, and consequences of PONV and how to prevent it with the administration of intravenous amisulpride.

***Measurable***

The success of the educational module will be determined through the examination of a survey that will be offered to the participants in the study. Outcomes will be evaluated based on the pre- and posttest questionnaire, knowledge on how to identify PONV and its risk factors, the consequences for the surgical patient and dose of amisulpride used to prevent PONV. A template from a software (Qualtrics) generated the surveys and evaluate data points.

***Achievable***

Anesthesia practitioners were educated on the causes of PONV in the surgical patient, extrinsic and intrinsic factors that contribute to PONV and its magnitude, and how to administer intravenous amisulpride as prophylaxis of PONV.

***Realistic***

Anesthesia providers will be educated on PONV and its treatment based on recent research by the student registered nurse anesthetist (SRNA). A PowerPoint presentation guided the educational encounter, and a test questionnaire was offered before and after the education.

***Time-Based***

The educational program was developed over a 6-month period. With the successful implementation of this educational module, anesthesia providers had a higher knowledge on PONV: etiology, risks, and consequences, as well as treatment options including the administration of intravenous amisulpride as prophylaxis of PONV.

## **Program Structure/SWOT Analysis**

An educational module on postoperative nausea and vomiting was developed and provided to anesthesia providers. It was guided by an organizational assessment that helped identify areas of lack of knowledge and internal and external variables that can impact and influence in the success of the module. The strengths, weaknesses, opportunities, and threats were analyzed and compared to the program goals to estimate feasibility and risks. The participants in this educational module are anesthesiologists and nurse anesthetist, to whom a survey was provided to complete before and after the educational module, to evaluate comprehension.

This project sought to determine anesthesia providers' knowledge of postoperative nausea and vomiting, specifically etiology, diagnosis, prevention, and treatment. The understanding on all these areas was measured through an initial questionnaire. Then, the educational module was provided addressing all the aforementioned areas of postoperative nausea and vomiting. A PowerPoint presentation was the primary delivery method, making the module more interactive and dynamic. After the module was finished, another questionnaire was provided to measure the new knowledge acquired; then, the two surveys were tabulated and compared.

### ***Strengths***

Studies have shown the negative impact on patients who suffer postoperative nausea and vomiting after a surgical procedure.<sup>37</sup> PONV may contribute to dehydration, electrolyte abnormalities, delayed wound healing and dehiscence, pulmonary aspiration of gastric content, and extended hospital stay.<sup>1,2</sup> Despite the widespread use of short-acting anesthetic agents, antiemetic drugs as prophylaxis, and minimally invasive procedures, PONV still affects about

20% to 30% of surgical patients. It could be as high as 80% in high-risk patients.<sup>3</sup> One of the reasons why there is a high incidence of PONV is the increased number of ambulatory surgical procedures.<sup>3</sup> There is an extensive repertoire of literature supporting strategies to prevent PONV, but the optimal recommendation has not been established.<sup>2</sup>

### ***Weaknesses***

As an internal issue that may be a negative impact to the program is the anesthesia providers' lack of update information about prophylaxis options for postoperative nausea and vomiting, especially those who do not use any drug to try to mitigate this postoperative complication. PONV will occur in one-third of patients who do not receive prophylaxis, but depending on the risk factors, the incidence can be as high as 80%.<sup>38</sup>

Ondansetron remains the drug of choice for prevention and treatment of PONV.<sup>5</sup> Ondansetron hydrochloride is a selective inhibitor of type 3 serotonin receptors or 5-HT<sub>3</sub> receptors. It is preferred over other antiemetics by most anesthesia. When used as a prophylaxis of PONV in adults, a 4 mg intravenous dose is recommended at least 30 minutes before emergence from anesthesia. The half-life of ondansetron is usually about 4 hours; therefore, it is recommended to administer it towards the end of the surgical procedure.<sup>5</sup> There are several side effects, with headache, dizziness, diarrhea, elevated liver enzymes, and constipation being the most common.

Ondansetron is associated with QTc segment elongation, and the potential increased risk of cardiac arrest and arrhythmia.<sup>39</sup> Ondansetron was proven to be less efficacious than ramosetron, granisetron, palonosetron, aprepitant, and fosaprepitant. Despite these facts, ondansetron continues to be the first choice, even when superior drugs are available.<sup>9</sup>

### ***Opportunities***

Amisulpride is a dopamine D2, D3 receptors antagonist. Amisulpride 5 mg intravenously was found to be more effective than placebo in achieving a complete response and reducing the severity of nausea.<sup>9</sup> Administration of amisulpride has been associated with a mild increase in levels of prolactin, but the clinical importance remains unclear. A standard antiemetic dose of amisulpride it is not associated with sedation, extrapyramidal side effect, or QTc segment prolongation.<sup>24-27</sup>

When intravenous amisulpride is given at induction of anesthesia in combination with a standard antiemetic significantly decreases the incidence of PONV in a population of patients at high risk of PONV undergoing a broad range of surgeries under general anesthesia using volatile agents.<sup>24,25</sup> Amisulpride, when used in combination with other class antiemetics, is well-tolerated and has similar results compared to placebo in respect of safety profile.<sup>25</sup> The effectiveness of amisulpride as prophylaxis for PONV is higher when combined with dexamethasone than with ondansetron.<sup>25</sup>

### ***Threats***

Several factors may harm the development and successful implementation of this program, as well as the adoption of new treatment strategies for PONV like the use of intravenous amisulpride as a prophylactic agent.<sup>9</sup> The high cost of new medications and quality healthcare is one of the most pressing issues to resolve if we are to bring health services to every American. Absent change that creates an accessible system, the quality of patient safety and outcomes are compromised.<sup>27</sup> The price of healthcare provided by institutions is determined by the marketplace. National and local regulations are enacted to control and monitor the cost of healthcare services, but too often, these regulations

negatively impact the quality of care. As price becomes more accessible, the disparity between cost and quality of care too often increases.

The application of evidence-based practice approaches to health care services is perceived as optional. Yet, many providers lack knowledge or access to current evidentiary information and so evidence-based practice is not applied in their patient care. Others simply refuse to adopt new practices, contributing to an inherent weakness in the healthcare system. Currently, patient care is moving towards an approach that relies on proven scientific evidence to form solid arguments for guidance and decision-making.<sup>40</sup> Still, some practitioners, based on perpetuated methods, trust in tradition, intuition, or other unproven processes.<sup>41</sup> Understanding and applying evidence-based practices in the clinical environment challenges outmoded traditional practices that create a gulf between previous methods and current research.<sup>42</sup>

### **Organizational Factors**

The development and implementation of the PONV educational module was conducted under the guidance of an interdisciplinary team. Several steps guided the development of the module. The achievement of the program goals were measured by comparing and analyzing the data collected. We provided a posttest questionnaire in the evaluation period, and it calculated the effectiveness of this program. Recommendations to this program will follow, based on these results, to improve its quality and efficacy.

### **Theoretical Framework**

The healthcare environment continues to change. Scientific knowledge and practice evolve and expand at an exponential rate to provide safe and high-quality patient care while keeping healthcare institutions viable. Innovation is necessary for long-term success, and organizations must be adaptable to change to succeed.<sup>43</sup> The identification and application of

new knowledge into clinical practice is a transformative process that allows for the adoption of evidence-based practice (EBP) within an organization. There are several organizational theories of change. Lewin's Force Field Analysis is a model consisting of three phases of change that can be used to translate EBP within organizations.<sup>44</sup>

In the *unfreezing phase* of Lewin's theory, the publication and distribution of current information exposing the consequences of postoperative nausea and vomiting among practitioners will propel understanding and behavior modification. Information about the use of amisulpride as new antiemetic must be provided, as many practitioners do not use safer alternatives due to a lack of knowledge.<sup>44</sup> In the *moving (or changing) phase*, the practitioners in the organization will prescribe more effective and safer alternatives to prevent PONV and inhibiting influences like lack of knowledge about new options or wide availability of traditional "not as good" choices, creating a new equilibrium between these positive and negative elements.<sup>44</sup> If this dynamic evolution continues, the third phase, *refreezing*, must happen to maintain the positive changes achieved, because of the adoption of new protocols and guidelines supporting the use of amisulpride versus ondansetron, for example, as a safer way to prevent PONV.<sup>44</sup>

## **V. Methodology**

### **Setting and Participants**

The primary setting for this DNP project was a large level 1 trauma center in South Florida, providing anesthesia services 24 hours a day by certified registered nurse anesthetists and anesthesiologists. Anesthesia providers are involved in approximately 25,000 surgical procedures annually.<sup>45</sup>

Approval through the International Review Boards (IRB) was requested for this project. Email addresses from future participants (anesthesia providers) were requested and used to send links to the pretest, the educational module, and the post-education questionnaire. All the participation is anonymous and voluntary.

### **Intervention and Procedures**

This educational intervention sought to improve the anesthesia providers' knowledge of postoperative nausea and vomiting, especially its etiology, diagnosis, and prophylaxis. The enhancement, creation, and dissemination of knowledge will follow a timeline, and it will adhere to standards protocols. The plan after submission and approval by Florida International University was submitted to the Anesthesia group, for which an IRB waiver would be expected. An individualized and nontransferable link will be sent to anesthesia providers (Anesthesiologists and CRNAs) as a distribution method for the pre- and post-questionnaires, and for the educational module. A voiceover PowerPoint was used to present the educational module. Questions and concerns were addressed by the author, and email and phone number were also provided for future communication if needed.

### **Protection of Human Rights**

Identifiers from anesthesia providers participating in this project were not collected or stored. No personal or medical record was accessed for data extrapolation. All questionnaire responses remained anonymous, protecting the right and privacy of all participants in this project. Potential benefits to participants included improved knowledge on postoperative nausea and vomiting and how to prevent, diagnose and treat. No harm, risk or any discomfort was anticipated to be suffered from any of this project's participants.

## **Data Collection**

A voiceover PowerPoint was used to provide information to meet the project goals, and data was collected during this presentation. Demographic information was requested, voluntarily, in the pretest. This included ethnicity, race, gender, as well as high level of education. The number of participants was expected to be around 15 anesthesia providers, working within the trauma center. Following consent, their knowledge will be recorded through the pre- and posttest. Both pre- and posttests consisted of approximately 15 questions focusing on etiology, diagnosis, and prevention of postoperative nausea and vomiting. Surveys were generated and disseminated via Qualtrics and exported into Excel for comparison between the pre- and posttests. IRB standards were followed to guarantee the validity and reliability of data collected.

## **Data Management/Analysis**

The database was password protected, and only the primary author had access to the data. No participant identifiers were collected, nor associated with any data entered and analyzed. A comparative analysis through Excel from Microsoft Software helped determine the anesthesia provider previous knowledge on PONV and the degree of learning acquired after the educational module.

## **V. Results**

### **Demographics**

The participants' demographic characteristics are illustrated in Table 1. A total of 22 anesthesia providers from the anesthesia group at this trauma center completed, after agreed informed consent, the pre-test survey, the educational module video presentation, and the posttest survey. The average age of the anesthesia providers was 40 years; 10 of the participants (45.45%) identified themselves as male and 12 (54.55%) as female. There were also a range of

ethnicities represented: Caucasian ( $n = 9$ , 40.91%), Hispanic ( $n = 8$ , 36.36%), African American ( $n = 2$ , 9.09%), Asian ( $n = 2$ , 9.09%) and West Indian ( $n = 1$ , 4.55%). All the participants ( $n = 22$ , 100%) were Certified Registered Nurse Anesthetists (CRNAs); 11 of them (50%) hold the Master of Science in Nursing (MSN) Degree while the other 11 (50%) hold a Doctor in Nursing Practice (DNP) Degree. The participants were questioned about the length of time practicing anesthesia, finding that the practice period ranged: up to 2 years ( $n = 6$ , 27.28%), 3 to 5 years ( $n = 4$ , 18.18%), 6 to 10 years ( $n = 4$ , 18.18%) and more than 10 years ( $n = 8$ , 36.36%).

**Table 1.** Participants' Demographics

Participants ( $N = 22$ )	Number	%
<b>Gender</b>		
Male	10	45.45
Female	12	54.55
<b>Ethnicity</b>		
Caucasian	9	40.91
African American	2	9.09
Hispanic	8	36.36
Asian	2	9.09
West Indian	1	4.55
<b>Position</b>		
CRNA	22	100
<b>Level of Education</b>		
MSN	11	50
DNP	11	50
<b>Years of Experience</b>		
0 – 2	6	27.28
3 – 5	4	18.18
6 – 10	4	18.18
Over 10	8	36.36

### Pretest Knowledge of PONV Incidence and Complications

Questions based on most common inquiries about the incidence and associated complications of Postoperative Nausea and Vomiting (PONV) were used to evaluate the participants' baseline knowledge about PONV and are shown in Table 2. The pretest survey

results revealed knowledge deficits in most of the questions per the data scores on each individual question.

The first question asked how high the incidence of PONV can be in patients undergoing surgery under general anesthesia. Two providers (9.09%) answered wrongly “20%.” Three providers (13.64%) also responder incorrectly “40%.” Ten providers (45.45%) responded “60%,” while only 7 providers (31.82%) responded correctly “80%.”

Providers were asked by how many times the administration of opioids intraoperatively, can increase the incidence of PONV. Two providers (9.09%) answered “1 to 2 times,” 13 CRNAs (59.09%) answered correctly “2 to 4 times,” 7 CRNAs (31.82%) answered “5 to 6 times.” When asked about the possible complications that could arise in patients suffering from PONV, 2 participants (9.01%) chose “wound dehiscence” while 20 participants (90.91%) chose “all of the above” (that included: wound dehiscence, unplanned hospital admission, aspiration, and dehydration).

### **Pretest Knowledge Related to PONV Treatment**

When asked about adverse drugs reactions of ondansetron, 100% of the participants (22) answered correctly “Q.T. prolongation.” The providers were also asked about the mechanism of action of amisulpride, 6 (27.28%) of them answered serotonin receptors antagonism, 7 (31.82%) correctly answered dopamine receptor antagonism, 4 (18.18%) of them related the effects to histamine receptors antagonism, and 5 (22.72%) of them to NK1 receptor antagonism.

A group of statements were offered to the participants and asked to identify the incorrect one related to the intravenous administration of amisulpride. When asked if amisulpride “does not” mildly increase prolactin levels, 6 (27.28%) participants choose this option. When asked if amisulpride “does not” cause Q.T. prolongation, 11 (50%) participants correctly select this

option. 1 (4.55%) provider choose “Effective in patients with 2+ PONV risk factors” while 4 (18.18%) chose “No sedation or extrapyramidal symptoms.”

Anesthesia providers were asked to identify the standard intravenous dose for prophylaxis of PONV. None of the participants answered 1 mg or 20 mg. 21(95.45%) of the providers correctly choose 5 mg. While 1 (4.55%) provider choose 10 mg as an answer. The providers were asked to select “True or false” for the following statement: “Amisulpride 5 mg IV is an efficacious PONV prophylactic dose”. 20 (90.90%) providers choose “true” while 2 of them (9.10%) selected False.

### **Pretest Attitude Related to Use of Amisulpride**

The participants were asked about the likelihood of using amisulpride as a prophylactic agent for PONV. 8 participants choose “extremely likely” to use amisulpride as a preventive agent for PONV. “Somewhat likely” was selected by 6 anesthesia providers, while 4 answered to be “neither likely nor unlikely.” Three providers answered: “somewhat unlikely” to use amisulpride while one selected “extremely unlikely.”

### **Pretest Attitude Related to Providers’ Recommendation of Amisulpride**

The anesthesia providers were asked about the likelihood recommending the using amisulpride as a prophylactic agent for PONV. Seven participants choose “extremely likely” to use amisulpride as a preventive agent for PONV. “Somewhat likely” was selected by 6 anesthesia providers, while 3 answered to be “neither likely nor unlikely.” Three providers answered: “somewhat unlikely” to use amisulpride while no one was “extremely unlikely.”

## Posttest Knowledge of PONV Incidence and Complications

Pre- and posttest knowledge questions regarding PONV incidence and complications are illustrated in Table 2. When asked how high the incidence of PONV can be in patients undergoing surgery under general anesthesia. Two providers (9.09%) answered incorrectly “40%.” Three providers (13.64%) also responder incorrectly “60%,” while 17 providers (77.27%) responded correctly “80%.” After the educational module the correct answer by providers increased by 45.45%.

Providers were asked by how many times, the administration of opioids intraoperatively, can increase the incidence of PONV. One provider (4.55%) answered “1 to 2 times,” 13 CRNAs (59.09%) answered correctly “2 to 4 times,” 5 CRNAs (22.72%) answered “5 to 6 times,” and 3 CRNAs (13.64%) answered “8 to 10 times.” The number of participants that responded correctly to this question (59.09%) remained unchanged after the educational module.

When asked about the possible complications that could arise in patients suffering from PONV, 1 participant (4.55%) chose “aspiration” while 21 participants (95.45%) chose “all of the above” (that included: wound dehiscence, unplanned hospital admission, aspiration, and dehydration). The percentage of correct participants for this question increased by 4.45%.

**Table 2.** Knowledge of PONV Incidence and Complications

Question	Pretest	Posttest	% Change
1. Depending on patient risk factors, the incidence of PONV can be as high as:			
20%	2 (9.09%)	0 (0%)	9.09 <sup>↓</sup>
40%	3 (13.64%)	2 (9.09%)	4.55 <sup>↓</sup>
60%	10 (45.45%)	3 (13.64%)	31.81 <sup>↓</sup>
80% (*)	7 (31.82%)	17 (77.27%)	45.45 <sup>↑</sup>
2. The administration of opioids intraoperatively can increase the incidence of PONV by:			
1 to 2 times	2 (9.09%)	1 (4.55%)	4.54 <sup>↓</sup>
2 to 4 times (*)	13 (59.09%)	13 (59.09%)	0

5 to 6 times	7 (31.82%)	5 (22.72%)	9.1 <sup>†</sup>
8 to 10 times	0 (0%)	3 (13.64%)	13.64
3. Untreated PONV can lead to:			
Wound dehiscence	2 (9.09%)	0 (0%)	9.09 <sup>†</sup>
Unanticipated hospital admission	0 (0%)	0 (0%)	0
Aspiration	0 (0%)	1 (4.55%)	4.55 <sup>†</sup>
Dehydration	0 (0%)	0 (0%)	0
All of the above (*)	20 (90.91%)	21 (95.45%)	<b>4.54 <sup>†</sup></b>

(\*) Correct Answer

### Posttest Knowledge Related to PONV Treatment

When asked about adverse drugs reactions of ondansetron 20 (90.90%) participants, as illustrated in Table 3, answered correctly “Q.T. prolongation.” This represents a 9.09% decrease when compared to with the pretest survey. This time, 1 provider (4.55%) responded incorrectly “aPTT prolongation,” while another one (4.55%) answered Hyperglycemia. The providers were also asked about the mechanism of action of amisulpride, 4 (18.18%) of them answered serotonin receptors antagonism, 16 (72.72%) correctly answered dopamine receptor antagonism, 1 (4.55%) of them related the effects to histamine receptors antagonism, and 1 (4.55%) of them to NK1 receptor antagonism.

A group of statements were offered to the participants and asked to identify the incorrect one related to the intravenous administration of amisulpride. When asked if amisulpride “does not” mildly increase prolactin levels, 1 (4.55%) participant choose this option. When asked if amisulpride “does not” cause Q.T. prolongation, 20 (90.90%) participants correctly select this option. This represents a 40.9% improvement in this area when compared to the pretest survey. One (4.55%) provider chose “No sedation or extrapyramidal symptoms,” while no one chose “Effective in patients with 2+ PONV risk factors.”

Anesthesia providers were asked to identify the standard intravenous dose for prophylaxis of PONV. None of the participants answered 1 mg or 20 mg. Nineteen (86.36%) of

the providers correctly choose 5 mg, while 3 (13.64%) providers choose 10 mg as an answer.

This represents a decline by 9.09% this correct answer. The providers were asked again to select

“true or false” for the following statement: “Amisulpride 5 mg IV is an efficacious PONV

prophylactic dose”. 20 (90.90%) providers choose “true,” while 2 of them (9.10%) selected

False, remaining unchanged when compared to the pretest survey.

**Table 3.** Knowledge of PONV Treatment

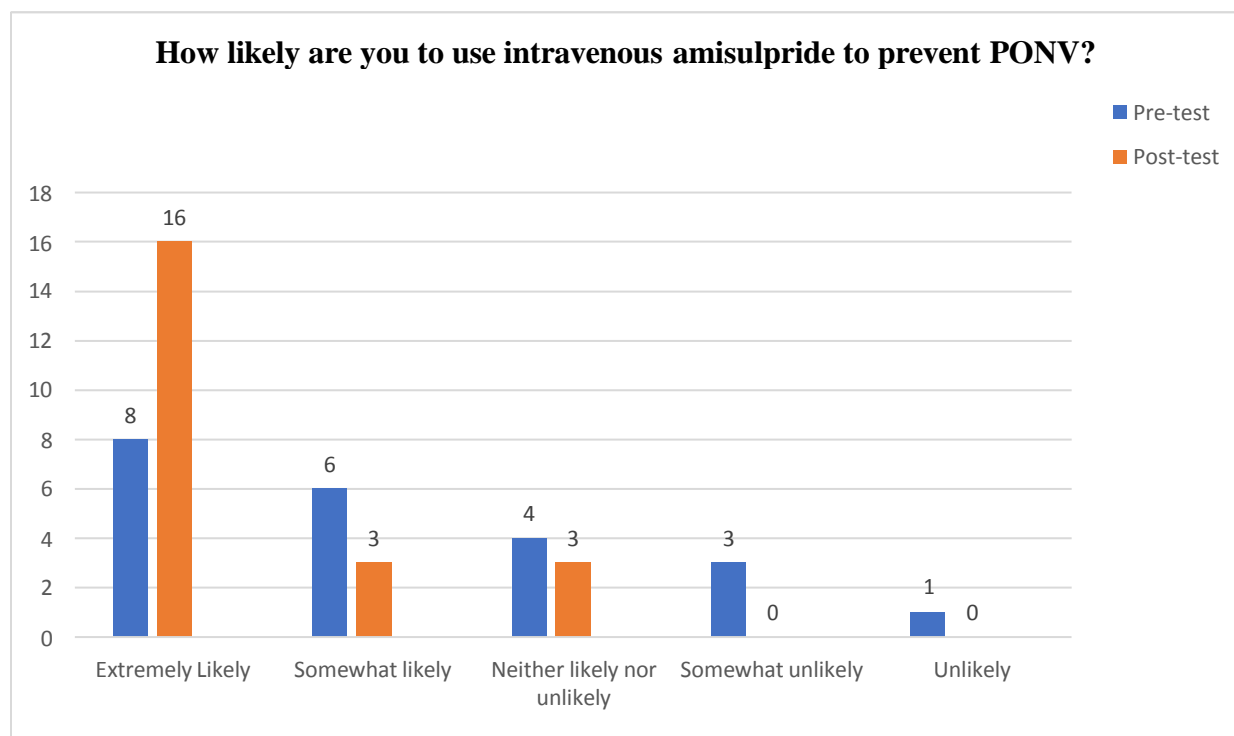
Question	Pretest	Posttest	% Change
4. Adverse drug reactions of Ondansetron (Zofran) include:			
Nausea	0 (0%)	0 (0%)	0
aPTT prolongation	0 (0%)	1 (4.55%)	4.55 <sup>†</sup>
QT prolongation (*)	22 (100%)	20 (90.90%)	9.09 <sup>‡</sup>
Hyperglycemia	0 (0%)	1 (4.55%)	4.55 <sup>†</sup>
5. Amisulpride prevent PONV by antagonizing:			
Serotonin receptors	6 (27.28%)	4 (18.18%)	9.1 <sup>‡</sup>
Dopamine receptors (*)	7 (31.82%)	16 (72.72%)	40.9 <sup>†</sup>
Histamine receptors	4 (18.18%)	1 (4.55%)	13.63 <sup>‡</sup>
NK1 receptors	5 (22.72%)	1 (4.55%)	18.17 <sup>‡</sup>
6. Which of the following is incorrect regarding the administration of Amisulpride?			
Mildly increase in prolactin levels	6 (27.28%)	1 (4.55%)	22.73 <sup>‡</sup>
QT prolongation (*)	11 (50%)	20 (90.90%)	40.9 <sup>†</sup>
Effective in patients with 2+ PONV risk factors	1 (4.55%)	0 (0%)	4.55 <sup>†</sup>
No sedation or extrapyramidal symptoms	4 (18.18%)	1 (4.55%)	13.63 <sup>‡</sup>
7. Standard IV dose of Amisulpride is:			
1 mg	0 (0%)	0 (0%)	0
5 mg (*)	21(95.45%)	19 (86.36%)	9.09 <sup>‡</sup>
10 mg	1 (4.55%)	3 (13.64%)	9.09 <sup>†</sup>
20 mg	0 (0%)	0 (0%)	0
8. Amisulpride 5 mg IV is an efficacious PONV prophylactic dose.			
True (*)	20(90.90%)	20(90.90%)	0
False	2 (9.10%)	2 (9.10%)	0

(\*) Correct Answer

### Posttest Attitude Related to Use of Amisulpride

The participants were asked about the likelihood of using amisulpride as a prophylactic agent for PONV after watching the educational module. (See Figure 2). This time, 16 participants choose “extremely likely” to use amisulpride as a prophylactic agent for PONV; this is a 100% increase from the pretest survey. “Somewhat likely” was chosen by 3 anesthesia providers, while 3 answered to be “neither likely nor unlikely.” No one answered “somewhat unlikely” or “extremely unlikely.”

**Figure 2.** How likely are you to use intravenous amisulpride to prevent PONV?

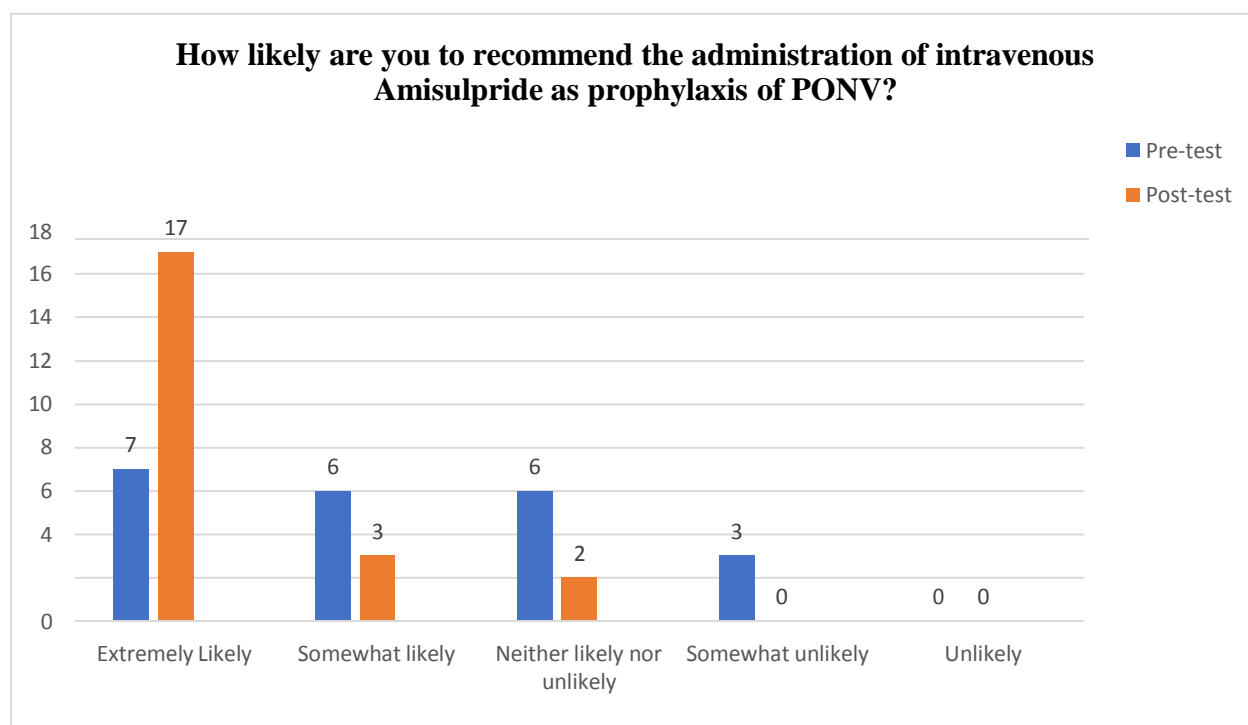


### Posttest Attitude Related to Providers' Recommendation of Amisulpride

The last question asked to the anesthesia providers was about the likelihood recommending the using amisulpride as a prophylactic agent for PONV (See figure 3). This time, 17 participants choose “extremely likely” to use amisulpride as a preventive agent for PONV,

this represents a 45.45% increase from the pre-test survey. “Somewhat likely” was chosen by 3 anesthesia providers, while 2 answered to be “neither likely nor unlikely”. None of the providers answered: “somewhat unlikely” nor “extremely unlikely.”

**Figure 3.** How likely are you to recommend the administration of intravenous Amisulpride as prophylaxis of PONV?



## VI. Discussion

### Limitations

Limitations of the study included the small sample size. Since the study was done in an extensive healthcare system, a larger group would have been preferable in enhancing the strength of the project. Time was another limitation for this project, since anesthesia providers were asked to complete the posttest survey immediately after watching the educational module; a more prolonged period would have been more beneficial in achieving better results. Lastly, the delivery method was limited since it was all done in online platform and asynchronous mode.

Despite these limitations, the findings of this project support the importance of educating anesthesia providers on the effectiveness of intravenous amisulpride for prophylaxis of PONV.

### **Future Implications for Advances Nursing Practice**

Evidence-based practice improve significantly the outcomes in the clinical practice and combined with continuous education renew and strengthen the advance nursing knowledge while increasing patient satisfaction.<sup>46</sup> The significant impact of this intervention will provides additional ability on Postoperative Nausea and Vomiting (PONV), a prevalent complication seen in patients undergoing general surgery. At the same time, patient with a lower incidence, as well as less severity of PONV, will experience better outcomes and a decrease in associated complications related to PONV.

### **Conclusions**

The literature review demonstrated that amisulpride has a safer profile when compared to ondansetron, and it was transmitted in a form of virtual educational module to the anesthesia providers. As the posttest results show, there is an improvement in most of the areas examined in the questions asked to the participants. This Quality Improvement project met the objectives of improving the anesthesia providers' knowledge on PONV as well their expertise on ondansetron and amisulpride as prophylactic drugs to reduce the incidence of PONV. The positive feedback received after the educational module, about using and recommending amisulpride as preventative method for PONV a successful intervention, not only in promoting, but in educating about the advantages of intravenous amisulpride oven ondansetron for prophylaxis of postoperative nausea and vomiting.

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## Appendix

### Appendix A. Letter of Support



March 1, 2022

Yasmine Campbell, DNP, CRNA, APRN  
Clinical Assistant Professor,  
Department of Nurse Anesthesiology  
Florida International University

Dr. Campbell,

Thank you for inviting Broward Health to participate in the Doctor of Nursing Practice (DNP) project conducted by Odlanier Hebert entitled "Advantages of Intravenous Administration of Amisulpride over Ondansetron for Prophylaxis of Postoperative Nausea and Vomiting: An Educational Module" in the Nicole Wertheim College of Nursing and Health Sciences, Department of Nurse Anesthetist Practice at Florida International University. I have warranted his permission to conduct the project using our providers.

Evidence-based practice's primary aim is to yield the best outcomes for patients by selecting evidence-supported interventions. This project intends to evaluate if a structured education targeting providers will increase knowledge on the use of Amisulpride over Ondansetron in the post-operative population to decrease nausea and vomiting.

We understand that participation in the study is voluntary and carries no overt risk. All Anesthesiology providers are free to participate or withdraw from the study at any time. The educational intervention will be conveyed by a 15-minute virtual PowerPoint presentation, with a pretest and posttest questionnaire delivered by a URL link electronically via Qualtrics, an online survey product. Responses to pretest and posttest surveys are not linked to any participant. The collected information is reported as an aggregate, and there is no monetary compensation for participation. All collected material will be kept confidential, stored in a password-encrypted digital cloud, and only be accessible to the investigators of this study: Odlanier Hebert and Dr. Campbell. We expect that Odlanier Hebert will not interfere with normal hospital performance, behaving professionally and following standards of care.

Before implementing this educational project, the Florida International University Institutional Review Board will evaluate and approve the procedures to conduct this project. Once the Institutional Review Board's approval is achieved, this scholarly project's execution will occur over two weeks. We support the participation of our Anesthesiology providers in this project and look forward to working with you.

February 1, 2022

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Edward Punzalan, DNP, CRNA, APRN  
Administrative Director of Nurse Anesthesia  
Healthcare Performance Anesco

Date

## Appendix B. IRB Approval



Office of Research Integrity  
Research Compliance, MARC 414

### MEMORANDUM

**To:** Dr. Yasmine Campbell

**CC:** Odlanier Hebert

**From:** Elizabeth Juhasz, Ph.D., IRB Coordinator *EJ*

**Date:** March 23, 2022

**Protocol Title:** "Advantages of intravenous administration of amisulpride over ondansetron for prophylaxis of postoperative nausea and vomiting: An educational module."

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The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

**IRB Protocol Exemption #:** IRB-22-0094      **IRB Exemption Date:** 03/23/22  
**TOPAZ Reference #:** 111524

As a requirement of IRB Exemption you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

**Special Conditions:** N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

EJ

## Appendix C. Invitation to Participants



# Nicole Wertheim College of Nursing & Health Sciences

### **Advantages of intravenous administration of amisulpride over ondansetron for prophylaxis of postoperative nausea and vomiting: An educational module.**

Dear Broward Health ANESCO Anesthesia Provider:

My name is Odlanier Hebert, I am a student from the Anesthesiology Nursing Program Department of Nurse Anesthetist Practice at Florida International University. I am writing to invite you to participate in my quality improvement project. The goal of this project is to improve health care provider knowledge on the advantages of intravenous administration of amisulpride over ondansetron for prophylaxis of postoperative nausea and vomiting. You are eligible to take part in this project because you are a member of the Anesthesia Department for ANESCO at Broward General Medical Center.

If you decide to participate in this project, you will be asked to complete and sign a consent form for participation. Next, you will complete a pre-test questionnaire, which is expected to take approximately 5 minutes. You will then be asked to view an about 15-minute-long educational presentation online. After watching the video, you will be asked to complete the post-test questionnaire, which is expected to take approximately 5 minutes. *No compensation will be provided.*

Remember, this is completely voluntary. You can choose to be in the study or not. If you'd like to participate or have any questions about the study, please email or contact me at [othebe002@fiu.edu](mailto:othebe002@fiu.edu) or (786) 329 0455.

Thank you very much.

Sincerely,

Odlanier Hebert, SRNA, BSN, CCRN

## Appendix D. Informed Consent



CONSENT TO PARTICIPATE IN A QUALITY IMPROVEMENT PROJECT  
 “Advantages of intravenous administration of amisulpride over ondansetron for prophylaxis of postoperative nausea and vomiting: An educational module.”

### SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** Educational module to improve knowledge in utilizing amisulpride for prophylaxis of Postoperative Nausea and Vomiting.
- **Procedures:** If you choose to participate, you will be asked to complete a pre-test, watch a voice PowerPoint and then a post test
- **Duration:** This will take about a total of 20 minutes.
- **Risks:** The main risk or discomfort from this research is minimal. There will be minimal risks involved with this project, as would be expected in any type of educational intervention, which may have included mild emotional stress or mild physical discomfort from sitting on a chair for an extended period.
- **Benefits:** The main benefit to you from this research is increase the participant’s knowledge in utilizing amisulpride for prophylaxis of Postoperative Nausea and Vomiting.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.

### PURPOSE OF THE PROJECT

You are being asked to be in a quality improvement project. The goal of this project is to improve anesthesia provider knowledge on the use of amisulpride for prophylaxis of Postoperative Nausea and Vomiting.

### NUMBER OF STUDY PARTICIPANTS

If you decide to participate you will be one of 10 participants under the purpose of the project.

## DURATION OF THE PROJECT

Your participation will require about 20 minutes of your time.

## PROCEDURES

If you agree to be in the project, we will ask you to do the following: Complete an online 10 question pre-test survey via Qualtrics, an Online survey product for which the URL link is provided. Review the educational PowerPoint Module lasting 10 minutes via Qualtrics, an Online survey product for which the URL link is provided. Complete the online 10 question post-test survey via Qualtrics, an Online survey product for which the URL link is provided.

## RISKS AND/OR DISCOMFORTS

The main risk or discomfort from this research is minimal. There will be minimal risks involved with this project, as would be expected in any type of educational intervention, which may have included mild emotional stress or mild physical discomfort from sitting on a chair for an extended period of time, for instance.

## BENEFITS

The following benefits may be associated with your participation in this project: An increased understanding on the perioperative prevention of Postoperative Nausea and Vomiting by administering intravenous amisulpride as a prophylactic drug to patients undergoing surgery under general anesthesia.

The overall objective of the program is to increase the quality of healthcare delivery and improve healthcare outcomes for our patients.

## ALTERNATIVES

There are no known alternatives available to you other than not taking part in this project.

However, if you would like to receive the educational material given to the participants in this project, it will be provided to you at no cost.

## CONFIDENTIALITY

The records of this project will be kept private and will be protected to the fullest extent provided by law. If, in any sort of report, we might publish, we will not include any information that will make it possible to identify you as a participant. Records will be stored securely, and only the project team will have access to the records.

**PARTICIPATION:** Taking part in this research project is voluntary.

## COMPENSATION & COSTS

There is no cost or payment to you for receiving the health education and/or for participating in this project.

#### RIGHT TO DECLINE OR WITHDRAW

Your participation in this project is voluntary. You are free to participate in the project or withdraw your consent at any time during the project. Your withdrawal or lack of participation will not affect any benefits to which you are otherwise entitled. The investigator reserves the right to remove you without your consent at such time that they feel it is in the best interest.

#### RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this quality improvement project, you may contact Odlanier Hebert at 786-329-0455 or [othebe002@fiu.edu](mailto:othebe002@fiu.edu) and Yasmine Campbell at 305-348-9894 or [ycampbell@fiu.edu](mailto:ycampbell@fiu.edu).

#### IRB CONTACT INFORMATION

If you would like to talk with someone about your rights pertaining to being a subject in this project or about ethical issues with this project, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at [ori@fiu.edu](mailto:ori@fiu.edu).

#### PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. By clicking on the “consent to participate,” button below I am providing my informed consent.

## Appendix E. Data Collection Instrument (Pre- and Post-test Survey)



### Pretest and Posttest Questionnaire:

#### Intravenous Amisulpride to Prevent Postoperative Nausea and Vomiting (PONV)

#### INTRODUCTION

The primary aim of this Q.I. project is to improve the knowledge of Anesthesia Providers regarding the administration of intravenous Amisulpride (Barhemsys<sup>®</sup>) as prophylaxis for PONV in patient older than 12 years old undergoing surgery under general anesthesia, to improve patient outcomes in this population.

Please answer the question below to the best of your ability. The questions are either in multiple choice or true/false format and are meant to measure knowledge and perceptions on PONV and its prophylactic treatment by intravenous administration of Amisulpride.

#### PERSONAL INFORMATION

1. **Gender:** Male \_\_\_ Female \_\_\_ Other \_\_\_\_\_
2. **Age:** \_\_\_\_\_
3. **Ethnicity:**  
 Hispanic \_\_\_ Caucasian \_\_\_ African American \_\_\_ Asian \_\_\_  
 Other \_\_\_\_\_
4. **Position/Title:** \_\_\_\_\_
5. **Higher Level of Education:** MSN \_\_\_ DNP \_\_\_ MD \_\_\_ Other \_\_\_\_\_
6. How many years have you been an anesthesia provider?  
 Over 10 years \_\_\_ 5-10 years \_\_\_ 2-5 years \_\_\_ 1-2 years \_\_\_

**QUESTIONNAIRE**

- 1. Depending on patient risk factors, the incidence of PONV can be as high as:**
  - a. 20%
  - b. 40%
  - c. 60%
  - d. 80%
  
- 2. The administration of opioids intraoperatively can increase the incidence of PONV by:**
  - a. One to two times
  - b. Two to four times
  - c. Five to six times
  - d. Eight to ten times
  
- 3. Untreated PONV can lead to:**
  - a. Wound dehiscence
  - b. Unanticipated hospital admission
  - c. Aspiration
  - d. Dehydration
  - e. All the above
  
- 4. Adverse drug reactions of Ondansetron (Zofran) include:**
  - a. Nausea
  - b. aPTT prolongation
  - c. Q.T. prolongation
  - d. Hyperglycemia

- 5. Amisulpride prevents PONV by antagonizing:**
- a. Serotonin Receptors
  - b. Dopamine Receptors
  - c. Histamine Receptors
  - d. NK1 Receptors
- 6. Which of the following is INCORRECT regarding the administration of a standard dose of intravenous Amisulpride for prevention of PONV?**
- a. Mildly increase in prolactin levels
  - b. Q.T. prolongation
  - c. Effective antiemetic effect in patients with 2 or more PONV risk factors
  - d. Does not cause sedation or extrapyramidal symptoms
- 7. Standard prophylactic dose of Amisulpride is a single intravenous bolus of:**
- a. 1 mg
  - b. 5 mg
  - c. 10 mg
  - d. 20 mg
- 8. Amisulpride 5 mg intravenously is efficacious as prophylaxis for PONV and reducing the seriousness of nausea and vomiting. True or False.**
- a. True
  - b. False
- 9. How likely are you to use intravenous amisulpride to prevent PONV?**
- a. Most likely
  - b. Somewhat likely

- c. Somewhat unlikely
  - d. Most unlikely
- 10.** How likely are you to recommend the administration of intravenous Amisulpride as prophylaxis of PONV?
- a. Most likely
  - b. Somewhat likely
  - c. Somewhat unlikely
  - d. Most unlikely

# Appendix F. PowerPoint Presentation for Educational Module

**Advantages of intravenous administration of amisolpride over ondansetron for prophylaxis of postoperative nausea and vomiting: An educational module.**

Nick Wertheim College of Nursing & Health Sciences  
Florida International University  
Collaborator: Robert BSK, RN, CCRN  
Dr. Vanessa Campbell DNP, CRNA, APRN

**Learning Goals**

From this quality improvement module, you will:

- Discuss Postoperative Nausea and Vomiting (PONV)
- Discuss Ondansetron as a prophylactic drug
- Discuss Amisolpride as a prophylactic drug
- Understand the advantages of Amisolpride over Ondansetron

**Background**

PONV remains number two complaint in surgical patients, after pain.<sup>1</sup>

Direct consequences from PONV include pulmonary aspiration of gastric material, dehydration, electrolyte imbalance, delayed healing, nausea, delirium, and delayed hospital discharge.<sup>2</sup>

PONV affects on average 20–30 percent of the surgical population, and up to 80 percent.<sup>3</sup>

The administration of opioids increase the incidence of PONV by two to four times.<sup>4</sup>

Different mechanisms can stimulate the vomiting center through dopaminergic, cholinergic, serotonergic, or histaminergic receptor stimulation.<sup>5</sup>

The most prevalent associated factors of PONV are female patients, patients younger than fifty years old, gravity, previous episodes of PONV or motion sickness, a body mass index less than 23 kg/m<sup>2</sup>, non smokers, laparoscopic surgeries, procedures lasting more than one hour, opioid administration and characteristics of the surgical procedure.<sup>6</sup>

**Scope of the Problem**

Globally, about 20 million people suffer PONV every year.<sup>7</sup>

The incidence of PONV is highest in the first 6 hours after surgery.<sup>7</sup>

PONV is the principal reason for unplanned hospital admission, extended hospital stays, and higher overall costs.<sup>8</sup>

High level of discomfort and dissatisfaction in a patient suffering PONV.<sup>9</sup>

Increased direct and indirect costs with the incidence of PONV.<sup>10</sup>

**Current Practice**

Multimodal PONV prophylaxis is recommended with two or more methods.<sup>11</sup>

Ondansetron was proven to be less efficacious than trimethoprim, granisetron, palonosetron, aprepitant, and fosoprepitant. Despite these facts, ondansetron continues to be the first choice, even when superior drugs are available.<sup>12</sup>

PONV management guidelines are insufficiently implemented in both adults and pediatric populations.<sup>13,14</sup>

Only 47% of postoperative nausea and vomiting occurrences are acknowledged in the post anesthesia care unit, and 20% are diagnosed in the surgical unit.<sup>15</sup>

**Ondansetron**

Selectively antagonizes the 5-HT<sub>3</sub> receptor (serotonin).<sup>13</sup>

Central and peripheral function in preventing PONV.<sup>13</sup>

Headache, constipation, and fatigue are frequent side effects.<sup>12</sup>

QT prolongation (Torsade de Pointes and other lethal arrhythmias).<sup>13</sup>

**Ondansetron**

Usual prophylactic dose in the adult patient: 4 mg Intravenously (IV).<sup>16</sup>

Reduces vomiting by 16.7 percent in the first 24 hours postoperatively in patients undergoing laparoscopic cholecystectomy.<sup>17</sup>

Reduces nausea by 5 percent and vomiting by 6 percent in the first 2 hours postoperatively in the male population.<sup>17</sup>

Reduces nausea by 6 percent and vomiting by 9 percent in the first 24 hours postoperatively in the male population.<sup>17</sup>

Reduces nausea by 10 percent and vomiting by 13 percent in the first 24 hours postoperatively in the female population.<sup>16</sup>

**Amisolpride**

Antagonizes D2 and D3 (dopamine) receptors.<sup>17</sup>

No sedation, extrapyramidal symptoms or QT prolongation.<sup>18,21</sup>

Associated with mild elevation of prolactin, but overall high safety profile.<sup>18</sup>

**Amisolpride**

A prophylactic dose of 5 mg IV reduces frequency and intensity of PONV.<sup>22</sup>

In patients with 2 or more risk factors, it reduces incidence of PONV in 24 hours by 10 percent.<sup>20</sup>

Kranke et al.<sup>19</sup> demonstrated a reduction in vomiting episodes by 21 percent after administration of amisolpride as prophylaxis.<sup>19</sup>

Kranke et al.<sup>19</sup> demonstrated a reduction in nausea episodes by 27 percent after administration of amisolpride as prophylaxis.<sup>19</sup>

**Summary of Evidence**

Intravenous Amisolpride is an effective prophylactic agent for PONV and has high safety profile.<sup>19</sup>

Amisolpride decreases incidence of PONV even more when administered in combination of other class antiemetic.<sup>18,19</sup>

The effectiveness of amisolpride as prophylaxis for PONV is higher when combined with dexmedetomidine than with ondansetron.<sup>18</sup>

**Take home points**

- PONV is an early complication of different operations and procedures and it can negatively affect the patient's quality of life and overall recovery.
- Healthcare providers should implement a multimodal PONV prophylaxis protocol that includes two or more methods.
- The benefits of PONV prophylaxis are well established. However, there are still gaps in the implementation of best practices in the perioperative setting. Being able to address these gaps will improve patient outcomes, reduce costs, and increase satisfaction.
- Amisolpride is an effective prophylactic agent for PONV and has high safety profile.
- Amisolpride decreases incidence of PONV even more when administered in combination of other class antiemetic.
- The effectiveness of amisolpride as prophylaxis for PONV is higher when combined with dexmedetomidine than with ondansetron.

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# Appendix G. PowerPoint Presentation for Dissemination of Project

### Advantages of intravenous administration of amisulpride over ondansetron for prophylaxis of postoperative nausea and vomiting: An educational module

Olanier Hebert MSN, RN

Supervised by:  
 Dr. Yasmine Campbell DNP, CRNA, APRN  
 Dr. Amanda Andrews DNP, CRNA, APRN

Nicole Wertheim College of Nursing and Health Sciences  
 Florida International University

### Learning Goals

- Describe the epidemiology and consequences of Post Operative Nausea and Vomiting (PONV).
- Identify effective prophylactic alternatives to prevent PONV.
- Compare effectiveness and safety profile of ondansetron and amisulpride as a PONV prophylactic options.
- Identify advantages of amisulpride over ondansetron for prophylaxis of PONV.
- Educate anesthesia providers on the benefits of amisulpride for prevention of PONV.

### Identification of the Problem

**Nausea** - Unpleasant sensation referred to as a desire to vomit without the muscular movement that produces vomiting.

**Vomiting** - The act of expelling the gastric content.

**PONV** - Second most common complaint after a surgical procedure.  
 - Contributes to dehydrations, electrolyte abnormalities, delayed second healing and discharges, pulmonary aspiration of gastric contents, and extended hospital stay.

### BACKGROUND

PONV: Common complication after surgery.

Related to general anesthesia, anesthetic agents and opioids.

Frequent with larger surgeries.

Occurs in the first 24 hours, lasting for up to three days.

### Scope and Consequences of the Problem

20 million patients suffer PONV a year.

PONV: Main reason for unplanned hospital readmission, longer hospital stays, and higher overall costs.

Contributes to high level of discomfort and dissatisfaction.

### Addressing the Problem

Most current antiemetic drugs target one or more of the receptors activated in the mechanism of nausea. This includes serotonin, opioid, histamine, dopamine, and muscarinic.

Ondansetron	Amisulpride
<ul style="list-style-type: none"> <li>5HT<sub>3</sub> antagonist</li> <li>Blocks serotonin receptors</li> <li>Blocks dopamine receptors</li> <li>Blocks histamine receptors</li> <li>Blocks muscarinic receptors</li> </ul>	<ul style="list-style-type: none"> <li>Blockade of D<sub>2</sub> receptors</li> <li>Blockade of 5HT<sub>3</sub> receptors</li> <li>Blockade of histamine receptors</li> <li>Blockade of muscarinic receptors</li> <li>Blockade of dopamine receptors</li> </ul>

### DNP Project Purpose

Literature Review:  
 -> Using RCTs and comparing ondansetron and amisulpride, effectiveness and safety profile, establish the advantages of administration of one drug over the other one.

Educational Module:  
 -> To present an educational module to anesthesia providers about the advantages of intravenous administration of amisulpride over ondansetron, for the prevention of postoperative nausea and vomiting.

### PICO

In patients undergoing surgery under general anesthesia (P), what is the effect of intravenous amisulpride (I) compared to ondansetron (C) on preventing postoperative nausea and vomiting (O)?

- Population (P): Patients undergoing surgery under general anesthesia
- Intervention (I): Intravenous amisulpride
- Comparison (C): Intravenous ondansetron
- Outcomes (O): Prevention of postoperative nausea and vomiting

### Quality Improvement Methods

- Anesthesia providers at a large level 1 trauma center.
- IRB approval requested and granted from FIU and level 1 trauma center.
- Anonymous email sent to providers with link to Qualtrics containing pre and post questionnaires and the online educational module.
- A voiceover PowerPoint was used to present the educational module.
- Data generated via Qualtrics questionnaires were exported into Excel spreadsheet for comparison between the pre and post-test.

### RESULTS

Participants (n = 22)	Number	%
Gender		
Male	10	45.45
Female	12	54.55
Ethnicity		
Caucasian	9	40.91
African American	2	9.09
Hispanic	8	36.36
Asian	2	9.09
West Indian	1	4.55
Race		
Caucasian	22	100
Level of Education		
MSN	11	50
DNP	11	50
Years of Experience		
0 - 2	6	27.27
3 - 5	4	18.18
6 - 10	4	18.18
Over 10	8	36.36

### RESULTS

Outcome	Pre-test	Post-test	% Change
Number of patients with PONV	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with Nausea	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with Vomiting	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring rescue medication	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring hospital readmission	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring extended hospital stay	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring additional costs	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring patient dissatisfaction	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring patient discomfort	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring patient dissatisfaction	10 (45.45%)	2 (9.09%)	-76.36%
Number of patients with PONV requiring patient discomfort	10 (45.45%)	2 (9.09%)	-76.36%

### RESULTS

How likely are you to use intravenous amisulpride to prevent PONV?

How likely are you to recommend the administration of intravenous amisulpride as prophylaxis of PONV?

### Discussion

- Limitations:
  - Small sample size
  - Short duration of the project
  - Online delivery: Low response rate

### Discussion

- Future Implications for Advance Nursing Practice
  - Improved patient outcome through evidence-based prophylactic modification
  - Increased patient satisfaction
  - Decreased hospital stay and healthcare costs

### Conclusions

- Intravenous amisulpride has shown to be effective in preventive PONV and in having a safer profile when compared to ondansetron.
- Anesthesia providers improved their knowledge about PONV: epidemiology, diagnosis, complications and treatment.
- Anesthesia providers learned the advantages of intravenous amisulpride over ondansetron for prophylaxis of PONV.

### THANK YOU

- To Dr. Yasmine Campbell DNP, CRNA, APRN
- To Dr. Amanda Andrews DNP, CRNA, APRN
- To all the participants in this project.

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Appendix H. Poster



**Advantages of Intravenous Administration of Amisulpride Over Ondansetron for Prophylaxis of Postoperative Nausea and Vomiting**

Odlanier Hebert BSN, RN, Yasmine Campbell DNP, CRNA, APRN

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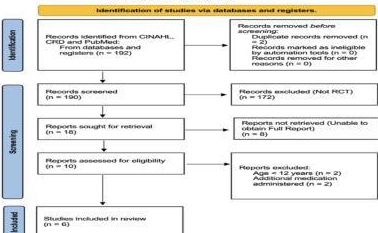
**BACKGROUND**

Postoperative Nausea and Vomiting (PONV) is the second most common complaint after a surgical procedure. PONV may contribute to dehydration, electrolyte abnormalities, delayed wound healing and dehiscence, pulmonary aspiration of gastric content, and extended hospital stay. Ondansetron remains one of the most used drugs to prevent PONV despite its potential for serious side effects. Amisulpride has proven to be effective for prophylaxis of PONV and demonstrated a safer profile.

**PURPOSE**

The aim of this evidence-based review is to compare the effectiveness of ondansetron and amisulpride for prophylaxis of PONV in the adult population undergoing surgery under general anesthesia. This information should be used to guide clinical practice and to optimize the patient's post-surgical recovery and prevent serious complications associated with the incidence of PONV.

**METHODOLOGY**



**PICO**

In patients undergoing surgery under general anesthesia what is the effect of intravenous amisulpride compared to ondansetron on preventing postoperative nausea and vomiting?



Image reference <https://www.myspina.net/treatment-of-postoperative-nausea-and-vomiting/>

**RESULTS**

- Intravenous amisulpride is an effective prophylactic agent for PONV and has higher safety profile compared to ondansetron.
- Amisulpride decreases incidence of PONV even more when administered in combination of other class antiemetic.
- The effectiveness of amisulpride as prophylaxis for PONV is higher when combined with dexamethasone than with ondansetron.

**RECOMMENDATIONS FOR PRACTICE**

To consider the administration of intravenous amisulpride as an effective and safe alternative to prevent PONV in the adult population undergoing surgery under general anesthesia.

**REFERENCES**

Available upon request  
Contact ohebe002@fiu.edu

LITERATURE REVIEW TABLE		
Authors	Design	Conclusions
So et al.	Prospective, Double-blind, Randomized Controlled Trial (RCT).	4 mg of IV ondansetron does not decrease incidence of PONV significantly.
Kovac et al.	Prospective, Multicenter, Stratified, RCT.	4 mg of IV ondansetron reduced nausea by 5% and vomiting by 6% in the first two hours. After initial 24 hours nausea was decreased by 6% and vomiting by 9%.
McKenzie et al.	Prospective, Double-blind, RCT.	4 mg of ondansetron reduced nausea and vomiting by 10 and 13%, respectively, in the first 24 hours.
Gan et al.	Two identical and concurrent, Double-blind Prospective, RCT.	5 mg of IV amisulpride reduced nausea and vomiting by 10 and 4%, respectively, in the first 24 hours, in patients with two or more risk factors.
Kranke et al.	International, Multicenter, Prospective, Double-blind, RCT.	5 mg of intravenous amisulpride is safe and efficacious for the prevention of PONV, decreasing the incidence by 11%.
Kranke et al.	Prospective, Multicenter, Double-blind, RCT.	5 mg of IV amisulpride decreased the incidence of PONV by 29% in 24 hours.

**Appendix I. Presentation al 33<sup>rd</sup> International Nursing Research Congress****Certificate of Presentation**

*Sigma Theta Tau International Honor Society of Nursing certifies that*

***Odlanier Hebert***

---

presented

*"Advantages of Intravenous Administration of Amisulpride over  
Ondansetron for Prophylaxis of Postoperative Nausea and Vomiting"  
On Wednesday, 3 August 2022, 6:00 AM - 11:00 PM*

***at the Sigma's 33rd International Nursing Research Congress***

Friday, 5 August 2022

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**Date**

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