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Comparison of The Effectiveness of Dexamethasone and Ondansetron In Preventing Postoperative Nausea and Vomiting (PONV) In Elective Surgical Patients: A Systematic Review

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Keywords

postoperative nausea and vomiting, PONV, dexamethasone, ondansetron, elective surgery, systematic review.

Abstract

Postoperative nausea and vomiting (PONV) is one of the most common postoperative complications and may reduce patient comfort, prolong hospital stays, and lead to further complications. Ondansetron and dexamethasone are widely used antiemetic agents for PONV prophylaxis; however, the comparative effectiveness of both drugs as monotherapy remains inconsistent across studies. This systematic review aimed to compare the effects of dexamethasone versus ondansetron on the incidence of PONV in patients undergoing elective surgery. This study was conducted according to the PRISMA 2020 guidelines. Literature was searched through multiple electronic databases. Eligible studies were randomized or quasi-randomized controlled trials involving adult patients undergoing elective surgery who received dexamethasone or ondansetron as PONV prophylaxis. Study selection was performed systematically, and five studies met the inclusion criteria for qualitative analysis. The findings demonstrated that dexamethasone and ondansetron showed relatively comparable effectiveness as monotherapy in reducing the incidence of PONV within the first 24 hours after surgery. However, several studies indicated that the combination of dexamethasone and ondansetron provided superior antiemetic efficacy compared with monotherapy.

INTRODUCTION

Postoperative nausea and vomiting (PONV) is a common complication that occurs following surgery and anesthesia, with an incidence of 20-30% in the general population and up to 80% in high-risk groups (Jamtsho et al., 2024). PONV can impair patient comfort, prolong recovery time, and delay discharge from healthcare facilities (Jin et al., 2020). In addition, PONV has the potential to trigger serious complications such as dehydration, electrolyte imbalance, and increased postoperative pressure (Weibel et al., 2020). Risk factors for PONV include female sex, a history of PONV or motion sickness, opioid use, and certain types of surgical procedures. Therefore, prevention of PONV has become an important component of modern perioperative management (Ahn et al., 2025).

The pathophysiology of PONV arises from multifaceted interactions among the central nervous system, the gastrointestinal system, and several neurotransmitter pathways. Critical structures such as the area postrema, the nucleus tractus solitarius, and the brainstem vomiting center function as principal hubs that receive and integrate emetic stimuli (Yi et al., 2022).

Several neurotransmitters, such as serotonin (5-HT), dopamine, histamine, acetylcholine, and substance P, also contribute to the activation of nausea and vomiting pathways. In addition, gastrointestinal irritation and the pharmacological effects of anesthetic agents may trigger serotonin release from enterochromaffin cells (Ghosh et al., 2020). This multifactorial mechanism explains why controlling PONV often requires precise and effective pharmacologic approaches (Farsani et al., 2024).

Ondansetron is a selective 5-HT3 receptor antagonist widely used for the prevention of PONV (Khoori et al., 2024). This drug acts by inhibiting serotonin activity on peripheral vagal nerves and central structures involved in the vomiting reflex. The use of ondansetron has been proven effective in reducing the incidence of nausea and vomiting during the first 24 postoperative hours (Li et al., n.d.). However, its effectiveness may be influenced by the type of surgery, patient risk factors, and the combination of anesthetic agents used (Mou et al., 2024). Dexamethasone is a corticosteroid with antiemetic effects through mechanisms that are not yet fully understood (Shen et al., 2019). These effects are thought to be related to inhibition of prostaglandin release, modulation of inflammatory pathways, and enhancement of postoperative analgesic effects (Xu et al., 2020; Yurkonis et al., 2024). In addition, dexamethasone may exert synergistic effects when combined with other antiemetic agents, including ondansetron. Its effectiveness in preventing PONV has been widely demonstrated across various types of elective surgical procedures (Czarnetzki et al., 2022).

Although both ondansetron and dexamethasone have been widely used as PONV prophylactic agents, direct comparisons between the two in elective surgical populations still show variable results (Khoori et al., 2024; Rachma et al., 2023). Some studies report the superiority of ondansetron, whereas others show that dexamethasone is more effective or at least equivalent. Variations in research methodologies, dosing, and types of surgical procedures make it difficult to draw consistent conclusions (Frelich et al., 2018; Selzer et al., 2020). Furthermore, there is still no standardized conclusion regarding which agent is superior as monotherapy for prophylaxis. Therefore, a comprehensive systematic review is needed to summarize the latest evidence and provide stronger recommendations for clinical practice. Specifically, this study aimed to analyze differences in the incidence rates of postoperative nausea and vomiting, the onset time of PONV, as well as the need for additional antiemetic therapy in patients receiving dexamethasone compared to ondansetron.

RESEARCH METHOD

This study is a systematic review conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency, validity, and reproducibility of the research process. This systematic review aims to identify, assess, and comprehensively synthesize the available scientific evidence regarding the comparative effectiveness of dexamethasone and ondansetron in preventing postoperative nausea and vomiting (PONV) among patients undergoing elective surgery. All stages of the research process, beginning from formulating the research question, developing the literature search strategy, article selection, data extraction, and synthesis of findings, were performed systematically in accordance with PRISMA 2020 standards.

The approach used in this study is an observational, literature-based design, in which the data sources consist of primary research articles published in national and international journals. This design was chosen because it provides an extensive overview of the effectiveness of both interventions across various clinical settings and diverse patient populations. Furthermore, systematic review methodology enables researchers to identify both the consistency and variability among existing study findings.

The selection of articles was carried out through a series of steps, including identification, screening, evaluation of eligibility, and final inclusion, all of which are illustrated in the PRISMA 2020 flow diagram. Articles that fulfilled the inclusion criteria were subsequently appraised for methodological quality and assessed for risk of bias to ensure that the synthesized evidence is dependable. Through this approach, the systematic review aims to deliver a strong scientific foundation for choosing appropriate PONV prophylactic agents in patients undergoing elective surgery.

A comprehensive literature search for this systematic review was performed using several major electronic databases to capture relevant and high-quality research evidence. The databases accessed included PubMed/MEDLINE, Scopus, ScienceDirect, and the Cochrane Library, selected for their extensive indexing of publications in medicine, anesthesiology, and perioperative research. Additionally, supplementary manual searching was carried out via Google Scholar to identify any potentially eligible studies that were not captured within the primary databases.

The literature search strategy was constructed using combinations of keywords and Boolean operators tailored to the search format of each database. The primary keywords used included “dexamethasone,” “ondansetron,” “postoperative nausea and vomiting,” “PONV,” and “elective surgery.” The keyword combinations were structured as follows: (“dexamethasone” AND “ondansetron”) AND (“postoperative nausea and vomiting” OR “PONV”) AND (“elective surgery”). This strategy was intended to identify all studies that directly compared the two interventions with respect to PONV incidence.

The search was restricted to studies published over the last decade, specifically between 2014 and 2025, to maintain the recency and clinical applicability of the evidence. Only English-language articles employing randomized controlled trial (RCT) designs were deemed eligible as the core evidence source. All retrieved records from each database were exported and organized using reference management software to eliminate duplicates prior to the screening process.

The establishment of inclusion and exclusion criteria in this systematic review was intended to ensure that the analyzed articles were highly relevant to the research question and possessed adequate methodological quality. The inclusion criteria comprised articles with a randomized controlled trial (RCT) design that directly compared dexamethasone and ondansetron as prophylactic agents for postoperative nausea and vomiting (PONV). The study population included adult patients aged ≥18 years undergoing elective surgery under general anesthesia. Eligible articles were required to clearly report PONV incidence within the first 24 postoperative hours, be published in English, and be available in full-text format within the publication range from 2014 to 2025.

The exclusion criteria included non-experimental study designs, such as observational studies, case reports, narrative reviews, editorials, and letters to the editor. Studies involving pediatric populations, emergency surgical cases, ICU patients, or individuals with significant neurological conditions were omitted from the analysis. In addition, articles assessing combined dexamethasone–ondansetron regimens without a direct monotherapy comparison group were not considered eligible. Studies with incomplete information, outcomes not related to PONV, or those unavailable in full-text format were also excluded from this review.

Article Selection Process

The article selection process in this systematic review was conducted in several structured stages according to the PRISMA 2020 guidelines, comprising identification, screening, eligibility assessment, and final inclusion. During the identification stage, all articles obtained from searches conducted in PubMed/MEDLINE, Scopus, ScienceDirect, the Cochrane Library, and Google Scholar were compiled and imported into reference management software. At this stage, all duplicate records identified across multiple databases were removed to avoid redundant counting.

The screening of titles and abstracts was subsequently performed independently by two reviewers to determine the relevance of each article to the research topic. Articles that did not address the comparison between dexamethasone and ondansetron, did not evaluate postoperative nausea and vomiting (PONV), did not involve elective surgical patients, or did not employ a randomized controlled trial (RCT) design were excluded during this stage (Kang et al., 2025; Wongyingsinn et al., 2022). Articles that met the initial screening criteria proceeded to full-text eligibility assessment.

In the eligibility stage, each full-text article was evaluated comprehensively based on the predefined inclusion and exclusion criteria. Articles that did not clearly report PONV outcomes, involved non-eligible populations, used combination therapy without a direct comparator group, or contained incomplete data were excluded. The reasons for exclusion at this stage were systematically documented to maintain transparency in the selection process.

Articles meeting all inclusion criteria were then included in the final stage for data extraction and qualitative analysis. The entire article selection process is presented in a PRISMA 2020 flow diagram, illustrating the number of studies at each stage of identification, screening, eligibility, and final inclusion. This structured approach ensured that the selection process was objective, transparent, and replicable.

Data extraction in this systematic review was carried out in a systematic and structured manner to ensure that all essential information from each included study was collected accurately and consistently. The extraction process was performed independently by two reviewers using a pre-designed data extraction form. In cases where discrepancies arose between the reviewers, discussions were held to reach a consensus, or a third reviewer was consulted as an independent adjudicator.

The extracted data from each study included study identification details (author names, year of publication, and country), study design, sample size, subject characteristics (age and sex), type of surgery, and the type and dosage of interventions administered in the dexamethasone and ondansetron groups. Additional extracted information included the method and timing of drug administration, as well as the duration of postoperative monitoring. The

primary outcome extracted was the incidence of postoperative nausea and vomiting (PONV) within the first 24 postoperative hours, encompassing nausea, vomiting, or both. Secondary outcomes included the need for rescue antiemetic use and any reported adverse effects associated with each intervention, such as hyperglycemia, headache, or sedation (Amirshahi et al., 2020; Kim et al., 2022).

All extracted data were compiled into a table of study characteristics to facilitate comparison across studies. These data then served as the basis for descriptive (narrative) synthesis in this systematic review. By employing a standardized data extraction approach, the resulting analysis is expected to be valid, objective, and scientifically reliable.

The assessment of risk of bias in the studies included in this systematic review was conducted using the Cochrane Risk of Bias Tool version 2.0 (RoB 2.0), an instrument specifically designed to evaluate the methodological quality of randomized controlled trials (RCTs). The assessment was performed independently by two reviewers, and any discrepancies in judgments were resolved through discussion until consensus was reached.

The RoB 2.0 tool evaluates five key domains: the randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting of results. Each study was classified into one of three categories of bias risk: low risk, some concerns, or high risk of bias. The results of these assessments were presented in tabular format and summarized graphically.

This risk of bias evaluation served as an essential component for interpreting and drawing conclusions from the synthesized evidence, ensuring that the overall quality of the included studies was considered objectively. Accordingly, this systematic review is expected to produce clinical recommendations that are not only evidence-based but also methodologically sound.

The data extracted from all studies that met the inclusion criteria were subsequently analyzed using a narrative (descriptive) synthesis approach. Narrative synthesis was conducted by grouping study findings based on the type of intervention, drug dosage, type of surgery, and the incidence of postoperative nausea and vomiting (PONV) outcomes. The results from each study were then compared to evaluate the consistency of effect direction between dexamethasone and ondansetron in preventing PONV. In addition, the synthesis included comparisons of PONV incidence, the need for rescue antiemetic use, and the occurrence of adverse events reported in each intervention group. The synthesized findings were presented in the form of summary tables and descriptive comparative narratives. Through this approach, a comprehensive overview of the relative effectiveness of dexamethasone and ondansetron as prophylactic agents for PONV in elective surgical patients was obtained.

RESULTS AND DISCUSSION

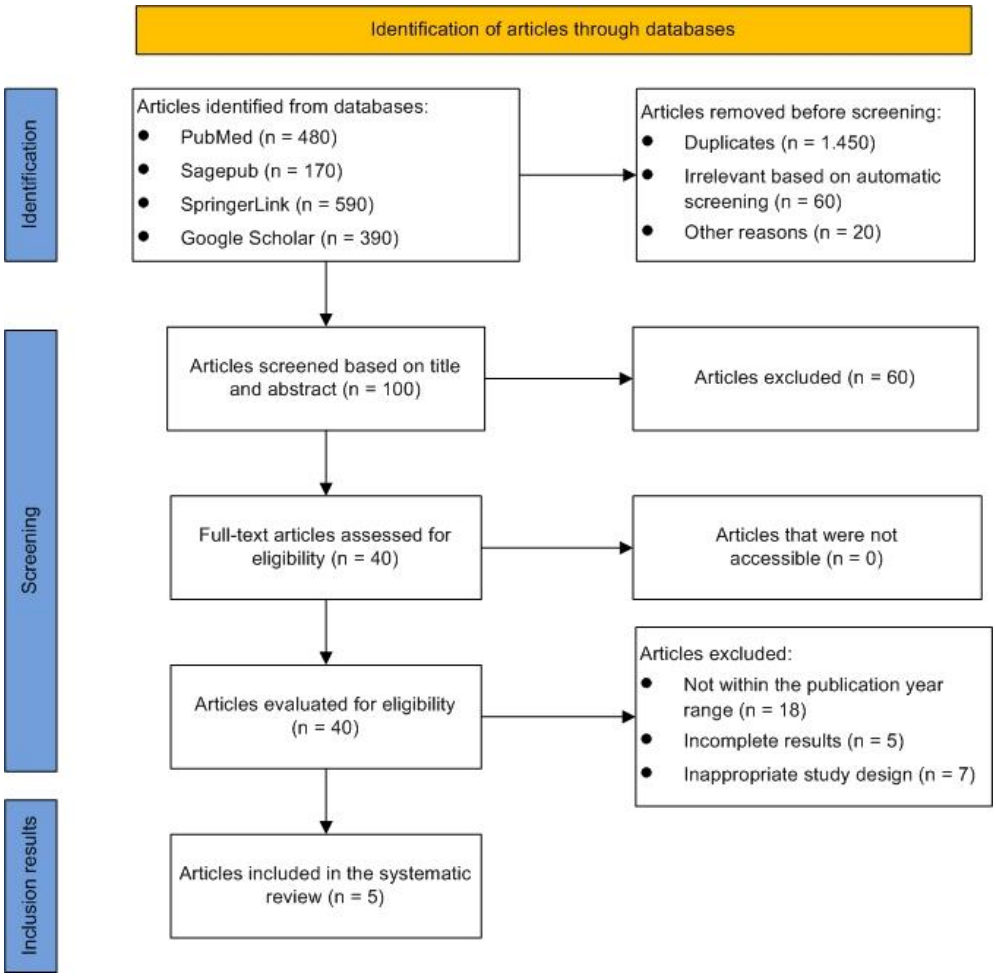
Search Results and Study Selection

The initial literature search conducted across various electronic databases identified a total of 1,630 articles, consisting of PubMed (n = 480), SagePub (n = 170), SpringerLink (n = 590), and Google Scholar (n = 390). All identified articles were then compiled into reference management software for the initial identification process. At this stage, 1,450 duplicate articles were found and subsequently removed. In addition, 60 articles were eliminated due to

irrelevance based on automatic screening, and 20 articles were excluded for other reasons, leaving a remaining set of articles for further screening.

The subsequent phase involved screening the titles and abstracts of the remaining 100 articles. In this step, 60 articles were excluded because they were unrelated to the research question, did not compare dexamethasone with ondansetron, did not address postoperative nausea and vomiting (PONV), or did not involve patients undergoing elective surgery. Following this screening process, 40 articles qualified for full-text assessment.

A total of 40 full-text articles were then assessed comprehensively based on the predetermined inclusion and exclusion criteria. At this eligibility stage, additional articles were excluded: 18 articles did not meet the publication year range, 5 articles contained incomplete results, and 7 articles used inappropriate study designs. Thus, a total of 30 articles were eliminated during this phase. Accordingly, 5 studies fulfilled all inclusion criteria and were included in the qualitative synthesis of this systematic review. These five studies were controlled clinical trials that directly compared the effectiveness of dexamethasone and ondansetron in preventing postoperative nausea and vomiting (PONV) among elective surgical patients.(10,22–25) The entire study selection process is presented in the PRISMA flow diagram (Figure 1).



Gambar 1. PRISMA Flow Diagram of Article Selection

General Characteristics of the Included Studies

The five studies included in this systematic review were clinical trials with randomized controlled trial (RCT) or quasi-randomized experimental designs, conducted in several countries, namely Pakistan, India, Iran, and Indonesia. The sample sizes varied across studies, with total participants ranging from 32 to 90 subjects per study. All studies involved adult patients (≥18 years) with ASA physical status I--II undergoing elective surgical procedures under general anesthesia. The types of surgeries examined included laparoscopic cholecystectomy, laparotomy, hysterectomy, and various other elective surgical procedures, all of which carry a recognized risk of postoperative nausea and vomiting (PONV) (Moonesan et al., 2024; Yoo et al., 2024).

All included studies compared dexamethasone and ondansetron as prophylactic agents for PONV, using either two-arm (direct comparison) or three-arm designs. The primary outcomes evaluated consistently across the five studies were the incidence of PONV within the first 24 postoperative hours, including nausea, vomiting, or a combination of both. Additional outcomes assessed in some studies included the need for rescue antiemetics and the severity of symptoms. The similarity of the basic study design, patient populations, and assessed outcomes indicates sufficient clinical homogeneity to allow qualitative synthesis across the five included studies (Chitta et al., 2022; Yang et al., 2024).

Characteristics of the Dexamethasone and Ondansetron Interventions

Across the five included studies, dexamethasone and ondansetron were administered intravenously (IV) as prophylactic agents for postoperative nausea and vomiting (PONV), although both the dosing regimens and timing of administration differed among studies. Dexamethasone doses ranged from 5 to 16 mg, with 8 mg IV being the most frequently used, typically administered before or at induction of anesthesia. In contrast, ondansetron was delivered at a more uniform dose of 4 mg IV, with administration timing varying but most often occurring near the end of the procedure or immediately before extubation. These administration patterns align with the pharmacodynamic profiles of the two drugs, wherein dexamethasone achieves maximal benefit when given earlier, while ondansetron demonstrates greater effectiveness when administered closer to the conclusion of surgery (Malik et al., 2021; Yanhil et al., 2016; Glebov et al., 2025).

Some studies employed a two-group design (dexamethasone vs. ondansetron) for direct comparison, while others used a three-group design (dexamethasone, ondansetron, and a combination of both). Despite variations in dosing and timing, all protocols remained within clinically recommended ranges for PONV prophylaxis. Although there were interstudy differences in intervention details, the overall approaches remained sufficiently consistent to allow qualitative comparison of the effectiveness of dexamethasone and ondansetron within this systematic review (Malik et al., 2021; Maitra et al., 2016).

Main Findings: Incidence of Postoperative Nausea and Vomiting (PONV)

Based on the five studies analyzed, the incidence of postoperative nausea and vomiting (PONV) within the first 24 hours after surgery demonstrated relatively comparable outcomes

between the dexamethasone and ondansetron groups. In the studies by Malik et al. 2021 and Yanhil et al. 2016, no statistically significant difference was observed between the two drugs in reducing postoperative nausea or vomiting. These findings indicate that dexamethasone and ondansetron have similar clinical effectiveness as monotherapy for PONV prophylaxis in several types of elective surgical procedures (Malik et al., 2021; Yanhil et al., 2016; Awad et al., 2016).

Conversely, in studies employing a three-arm design, such as those by Chitta et al. 2022, Moonesan et al. 2024, and Usmani et al. 2024, some variation in PONV incidence was noted between the dexamethasone and ondansetron groups, although direct differences between these two groups were not always statistically significant. However, these studies showed a tendency for dexamethasone to produce slightly lower rates of nausea compared with ondansetron alone, particularly during the early postoperative period. Nevertheless, these findings continued to vary across studies, likely influenced by differences in surgical type, drug dosage, and patient characteristics (Chitta et al., 2022; Moonesan et al., 2024; Teshome et al., 2020).

Overall, the qualitative synthesis of the five studies suggests that dexamethasone and ondansetron, when used as monotherapy, provide comparable levels of protection against PONV in elective surgical patients. There is no consistent evidence indicating that either drug is unequivocally superior in reducing PONV within the first 24 postoperative hours. These findings support the notion that the choice between dexamethasone and ondansetron for PONV prophylaxis may be tailored to clinical conditions, drug availability, and side-effect considerations (Moonesan et al., 2024; Yanhil et al., 2016; Nabovati et al., 2014).

Table 1. General Characteristics of the Included Studies

No	Authors & Year	Country	Study Design	Sample (n)	Type of Surgery	Dexa Group (n)	Ondan Group (n)	Mean Age	Primary Outcome
1.	Malik A. et al., 2021	Pakistan	Quasi-experimental randomized 2-arm	90	Laparoscopic cholecystectomy	45	45	37.1 ± 10.6 years	PONV 0–24 hours
2.	Usmani S. et al., 2024	India	Double-blind RCT, 3-arm	270	Open cholecystectomy	90	90	18–65 years	PONV & patient satisfaction
3.	Moonesan M. et al., 2024	Iran	Single-blind RCT, 3-arm	76	Hysterectomy	≈25	≈25	48.2 ± 7.7 years	PONV 0–24 hours
4.	Chitta P. et al., 2022	India	Prospective RCT, 3-arm	90	General elective surgery	30	30	18–60 years	PONV & complete response
5.	Yanhil SI. et al., 2016	Indonesia	Prospective experimental	32	Laparotomy	16	16	18–60 years	PONV

Table 2. Characteristics of Dexamethasone and Ondansetron Interventions

No	Authors	Dexamethasone	Timing of Dexa	Ondansetron	Timing of Ondan	Route
1.	Malik 2021	8 mg	At induction	4 mg	End of surgery	IV
2.	Usmani 2024	0.1 mg/kg	30 minutes before surgery	0.1 mg/kg	30 minutes before surgery	IV
3.	Moonesan 2024	16 mg	Pre-induction	4 mg	Pre-induction	IV
4.	Chitta 2022	8 mg	Before induction	4 mg	30 minutes before extubation	IV
5.	Yanhil 2016	5 mg	Before induction	4 mg	End of surgery	IV

Table 3. Extraction of PONV Outcomes

No	Authors	Nausea (%)	Vomiting (%)	Total PONV	Significant Difference
1.	Malik 2021	62.2 vs 62.2	62.2 vs 60.0	Comparable	Not significant ($p > 0.05$)
2.	Usmani 2024	Lowest in combination group	Lowest in combination group	Dex & Ond partially effective	Combination most superior
3.	Moonesan 2024	Lower in combination	Lower in combination	Combination best	Significant
4.	Chitta 2022	18.9 (Dex) vs 36.3 (Ond)	Lower in dexamethasone group	Combination best	Significant
5.	Yanhil 2016	37.5 (Dex) vs 12.5 (Ond)	Higher in dexamethasone group	Comparable	Not significant

The findings of this systematic review indicate that dexamethasone and ondansetron demonstrate relatively equivalent effectiveness as monotherapy for the prevention of postoperative nausea and vomiting (PONV) in patients undergoing elective surgery (Moonesan et al., 2024; Yanhil et al., 2016). These findings are consistent with several randomized controlled trials analyzed, which showed no statistically significant differences between the two agents in reducing postoperative nausea or vomiting. This equivalence suggests that both drugs may be used interchangeably as prophylactic options for PONV in clinical practice (Yurkonis et al., 2024; Chitta et al., 2022). As such, the choice between dexamethasone and ondansetron may be guided by other considerations, including side-effect profiles, drug availability, and patient-specific clinical factors. These findings have important implications for developing flexible and individualized PONV prophylaxis protocols (Maitra et al., 2016).

Pharmacologically, ondansetron acts as a selective serotonin 5-HT3 receptor antagonist, a pathway that plays a key role in triggering the emetic reflex both centrally and peripherally (Khoori et al., 2024; Kang et al., 2025). In contrast, the antiemetic mechanisms of dexamethasone are more complex and multifactorial, involving prostaglandin inhibition, modulation of inflammatory responses, and influence on central neurotransmitter activity (Xu et al., 2020; Czarnetzki et al., 2022). These mechanistic differences explain why both agents demonstrate comparable effectiveness as monotherapy, despite their distinct biological pathways. Additionally, the difference in timing of administration---dexamethasone typically

administered at induction and ondansetron near the end of surgery---likely contributes to the similar clinical outcomes observed across studies (Mou et al., 2024; Maitra et al., 2016).

In several studies with a three-arm design, combination therapy with dexamethasone and ondansetron provided superior outcomes compared with monotherapy, both in reducing PONV incidence and lowering the need for rescue antiemetic treatment (Teshome et al., 2020). These findings support the concept that PONV has a multifactorial pathophysiology, and targeting a single receptor pathway is often insufficient for optimal prevention (Jin et al., 2020; Rachma et al., 2023). Combining two agents with different mechanisms allows for synergistic effects that more effectively suppress nausea and vomiting pathways. This is consistent with recommendations from multiple anesthesia guidelines, which advocate multimodal prophylaxis for patients at moderate to high risk of PONV (Yi et al., 2022; Amirshahi et al., 2020).

Variability in study outcomes included in this systematic review is likely influenced by differences in surgical type, drug dosage, anesthetic techniques, and patient characteristics such as age, sex, and smoking status (Nabovati et al., 2014). Procedures such as laparoscopic cholecystectomy and hysterectomy are known to carry higher baseline risks of PONV. Additionally, differences in surgery duration and intraoperative opioid administration may affect PONV incidence. These factors potentially contribute to the heterogeneity observed across studies despite the use of the same antiemetic agents (Jamtsho et al., 2024; Yurkonis et al., 2024; Wongyingsinn et al., 2022).

Based on the findings of this systematic review, it can be concluded that dexamethasone and ondansetron as monotherapy possess comparable effectiveness in preventing PONV and may be utilized as first-line prophylactic agents in elective surgical patients. However, for those at high risk of PONV, combination therapy with both agents is more strongly recommended to achieve superior prophylaxis. A limitation of this systematic review is the relatively small number of included primary studies and the clinical variability across trials. Thus, larger randomized controlled trials with more standardized designs are needed to strengthen the evidence regarding the comparative effectiveness of dexamethasone and ondansetron in PONV prevention.

Study Limitations

This systematic review has several limitations that should be considered when interpreting the findings. First, the number of primary studies meeting the inclusion criteria was relatively limited, with only five controlled clinical trials included, thereby restricting the generalizability of the results. Additionally, there was variation in the types of surgical procedures analyzed—such as laparoscopic cholecystectomy, laparotomy, and hysterectomy—each of which carries different baseline risks for postoperative nausea and vomiting (PONV). Differences in patient characteristics, drug dosages, and timing of intervention administration may also have contributed to increased heterogeneity among the study outcomes.

Another limitation is the use of narrative synthesis rather than quantitative meta-analysis, which precluded statistical estimation of effect sizes. Some studies also employed three-arm designs, meaning that direct comparisons between dexamethasone and ondansetron were not always the primary focus. Furthermore, not all studies provided detailed reporting of adverse effects, limiting the ability to comprehensively evaluate the safety profiles of both

drugs. Therefore, the findings of this systematic review should be interpreted with caution, and further research with larger sample sizes and more standardized study designs is needed to strengthen the conclusions presented.

Clinical Implications

Based on the findings of this systematic review, dexamethasone and ondansetron may be used as equally effective monotherapy options for the prevention of postoperative nausea and vomiting (PONV) in patients undergoing elective surgery with low to moderate risk (Frelich et al., 2018). These findings provide clinicians with flexibility in selecting prophylactic agents based on drug availability, side-effect profiles, and patient-specific clinical considerations. Dexamethasone may serve as a suitable alternative in situations where ondansetron is unavailable or contraindicated, such as in patients with an elevated risk of QT interval prolongation (Weibel et al., 2020; Kang et al., 2025). Additionally, dexamethasone offers added benefits, including anti-inflammatory effects and reduced postoperative pain.

For patients at high risk of PONV---such as women, non-smokers, individuals with a previous history of PONV, or those undergoing laparoscopic and gynecologic procedures---the combination of dexamethasone and ondansetron is more strongly recommended, as evidence demonstrates superior protection compared with monotherapy. This multimodal prophylactic approach aligns with contemporary PONV management principles, which emphasize risk-stratified prevention strategies (Ahn et al., 2025; Farsani et al., 2024; Moonesan et al., 2024). Accordingly, the findings of this systematic review may serve as a foundation for developing more effective, individualized, and evidence-based PONV prophylaxis protocols in healthcare settings.

CONCLUSION

This systematic review of five controlled clinical trials found dexamethasone and ondansetron as monotherapies to be comparably effective in preventing postoperative nausea and vomiting (PONV) in elective surgical patients, with no consistent statistically significant differences in reducing symptoms within the first 24 postoperative hours. Several studies indicated superior antiemetic efficacy from their combination, especially in high-risk patients, supporting multimodal prophylaxis as optimal. For clinical practice, monotherapy suffices for low-to-moderate risk patients, while combination therapy is recommended for high-risk cases, tailored to patient factors and availability. Future research should prioritize large-scale RCTs with standardized designs, comprehensive adverse event reporting, cost-effectiveness analyses, and evaluations in special populations like geriatric patients or those with comorbidities.

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