



A Comparison Between Antiemetic Metoclopramide and Dexamethasone in Cesarean Section under Spinal Anesthesia

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مقارنة بين مضادَي القيء ميتوكلوبراميد وديكساميثازون في العمليات القيصرية تحت التخدير النخاعي

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Abstract:

Caesarean section is one of the most commonly performed surgical procedures worldwide, and its safety has significantly improved with the adoption of spinal anesthesia. However, spinal anesthesia is often associated with intraoperative and postoperative nausea and vomiting, which negatively impacts the patient's experience and surgical outcomes. This study aims to provide evidence-based insights into the effectiveness of Metoclopramide and Dexamethasone in managing nausea and vomiting following cesarean sections under spinal anesthesia, ultimately contributing to better management protocols and improved maternal outcomes. The study seeks to compare the effectiveness of metoclopramide and dexamethasone as antiemetic treatments in cases of cesarean section under spinal anesthesia. A pilot study was conducted on a group of women who underwent cesarean sections. They were divided into two groups: one group received metoclopramide and the other received dexamethasone. Nausea and vomiting were measured after the operation and any side effects were documented. The results showed that metoclopramide was more effective in reducing nausea and vomiting compared to dexamethasone, with the group receiving metoclopramide recording lower rates of nausea and vomiting, indicating its superiority as a treatment option in this context. Based on these

results, metoclopramide is recommended as part of the post-nausea and vomiting management protocol. Caesarean section under spinal anesthesia.

Keywords: Antiemetic, Metoclopramide, Anesthesia, Cesarean, Dexamethasone.

المخلص

تُعد العملية القيصرية واحدة من أكثر العمليات الجراحية شيوعًا في جميع أنحاء العالم، وقد تحسنت سلامتها بشكل ملحوظ مع اعتماد التخدير النخاعي. ومع ذلك، غالبًا ما يرتبط التخدير النخاعي بالغثيان والقيء أثناء وبعد العملية، مما يؤثر سلبًا على تجربة المريضة والنتائج الجراحية. تهدف هذه الدراسة إلى تقديم رؤى قائمة على الأدلة حول فعالية عقاري ميتوكلوبراميد وديكساميثازون في السيطرة على الغثيان والقيء بعد العمليات القيصرية تحت التخدير النخاعي، مما يساهم في النهاية في تحسين بروتوكولات العلاج وتحسين نتائج الأمهات. تسعى الدراسة إلى مقارنة فعالية ميتوكلوبراميد وديكساميثازون كعلاجات مضادة للقيء في حالات الولادة القيصرية تحت التخدير النخاعي. أجريت دراسة استطلاعية على مجموعة من النساء اللواتي خضعن لعمليات قيصرية، وتم تقسيمهن إلى مجموعتين: تلقت إحداهما ميتوكلوبراميد والأخرى ديكساميثازون. تم قياس الغثيان والقيء بعد العملية وتوثيق أي آثار جانبية. أظهرت النتائج أن الميتوكلوبراميد كان أكثر فعالية في تقليل الغثيان والقيء مقارنة بالديكساميثازون، حيث سجلت المجموعة التي تلقت الميتوكلوبراميد معدلات أقل من الغثيان والقيء، مما يشير إلى تفوقه كخيار علاجي في هذا السياق. وبناءً على هذه النتائج، يُوصى باستخدام الميتوكلوبراميد كجزء من بروتوكول علاج ما بعد الغثيان والقيء في العمليات القيصرية تحت التخدير النخاعي.

الكلمات المفتاحية: مضاد للقيء، ميتوكلوبراميد، تخدير، عملية قيصرية، ديكساميثازون.

INTRODUCTION

Cesarean section (CS) is one of the most frequently performed surgical procedures worldwide, and its safety has significantly improved with the adoption of spinal anesthesia. Spinal anesthesia is preferred for cesarean deliveries due to its benefits, including reduced maternal morbidity and improved neonatal outcomes. However, despite its advantages, spinal anesthesia is often associated with intra-operative nausea and vomiting (IONV) and postoperative nausea and vomiting (PONV), which are distressing for the patient and can complicate surgical and recovery processes. The reported incidence of IONV during cesarean delivery under spinal anesthesia ranges from 50% to 80% in the absence of prophylactic antiemetic therapy [1]. Effective prevention of IONV and PONV is therefore essential for enhancing patient satisfaction and ensuring smooth preoperative management [2].

Several pharmacological agents are used to prevent nausea and vomiting in cesarean deliveries, including serotonin 5-hydroxytryptamine (5-HT₃) receptor antagonists (e.g., ondansetron), dopamine receptor antagonists (e.g., metoclopramide), corticosteroids (e.g., dexamethasone), and antihistamines. Among these, metoclopramide and dexamethasone are widely used because of their affordability, efficacy, and safety profile [3].

Postoperative nausea and vomiting (PONV) and intra-operative nausea and vomiting (IONV) are common and distressing complications associated with cesarean sections performed under spinal anesthesia [4-9]. These complications can negatively affect both the patient's perioperative experience and surgical outcomes, potentially leading to aspiration, dehydration, electrolyte disturbances, prolonged hospital stays, and wound dehiscence. Effective management of IONV and PONV is essential to improve patient satisfaction, optimize preoperative care, and reduce healthcare costs [10].

Among the pharmacological interventions available, metoclopramide and dexamethasone have gained widespread attention due to their efficacy, affordability, and safety profile [11-13]. While both drugs are commonly used in clinical practice, their comparative effectiveness and

safety in cesarean deliveries under spinal anesthesia require further exploration to determine the optimal prophylactic approach [14,15]. This study is significant as it aims to provide evidence-based insights into the effectiveness of these two agents, ultimately contributing to better management protocols and improved maternal outcomes in cesarean sections. This article compares the effectiveness and safety of dexamethasone and metoclopramide in managing post-operative nausea and vomiting following cesarean delivery under spinal anesthesia. Dexamethasone and metoclopramide are effective in controlling PONV after spinal anesthesia for cesarean delivery. Is there a difference between them in reducing side effects and vomiting in caesarean sections?

This research is the first of its kind in this field in Benghazi there are no previous studies that have evaluated the difference in the use of the two medications dexamethasone and metoclopramide like this study previously. The Primary Aim is to compare the efficacy of metoclopramide and dexamethasone in preventing nausea and vomiting (PONV) in patients undergoing cesarean section under spinal anesthesia. And the Specific Objectives are to evaluate the incidence of PONV in patients receiving metoclopramide versus dexamethasone, to compare the safety profiles and side effects of metoclopramide and dexamethasone when used as prophylactic antiemetic agents, to determine the impact of these drugs on overall patient satisfaction and preoperative outcomes in caesarean deliveries, and finally to provide evidence-based recommendations for the selection of antiemetics in caesarean sections under spinal anaesthesia.

METHODS

STUDY DESIGN: This research is an observational cross-sectional design to assess the effectiveness of prophylactic anti-emetics in patients undergoing spinal anesthesia for cesarean sections. Data is collected prospective from patients' medical records, focusing on the incidence, severity, and duration of nausea and vomiting post-surgery.

STUDY POPULATION: The study targets adult female patients undergoing cesarean sections under spinal anesthesia at Benghazi Medical Center in Benghazi, Libya.

INCLUSION CRITERIA: Age range: 20–45 years, females undergoing elective cesarean section, and receiving spinal anesthesia.

EXCLUSION CRITERIA: patients with a history of severe nausea or vomiting, known allergies to anti-emetic medications, or presence of gastrointestinal disorders or other conditions influencing nausea or vomiting.

DATA COLLECTION: Data is extracted from patients' medical records and include the following: Patient demographics like age, medical history like diabetes mellitus and hypertension, Anti-emetic administration including type of anti-emetic used, and dosage, Postoperative outcomes like incidence of nausea and vomiting

STATISTICAL ANALYSIS: Descriptive statistics was used to summarize the characteristics of the study population and the observed outcomes. while Pearson correlation tests was used employed to compare the incidence of nausea and vomiting across different anti-emetic regimens, Age, and past medical history (PMH).

Ethical Considerations: The study will comply with ethical guidelines and seek approval. Written informed consent will be obtained from all participants. Data confidentiality and patient privacy were maintained throughout the study.

RESULTS

Demographic data: The ages of the 50 participating women ranged from 20 to 45 years. Among the study population, 3 patients had diabetes, 3 other patients had hypertension, and 1 patient had both diabetes and hypertension as shown in Table 1.

Table 1. Demographic data of participants

Characteristics	Number	Percentage
Age		
20-25	6	12%
26-30	13	26%
31-35	17	34%
36-40	10	20%
41-45	4	8%
Medical History		
DM	3	6%
HTN	3	6%
DM and HTN	1	2%
Nothing	43	86%

Drug preferences among age groups of women following cesarean sections: Figure 1 shows variations in medication usage among different age groups of women who underwent cesarean sections. Women aged 31-35 years are the most frequent users of both drugs, with 8 using Dexamethasone and 9 using Metoclopramide. In the 26-30 age group, Metoclopramide is preferred, with 8 users compared to 5 for Dexamethasone. For the 36-40 age group, Dexamethasone usage is higher (6 individuals) than Metoclopramide (4 individuals). In the 20-25 age group, 4 individuals use Dexamethasone, while only 2 use Metoclopramide. In the 41-45 age group, there is an equal distribution, with 2 individuals using each drug. Dexamethasone is more commonly used in the 20-25 and 36-40 age groups, while Metoclopramide is more frequently used in the 26-30 and 31-35 age groups. This variation reflects the differences in drug preferences among the different age groups of women following cesarean sections.

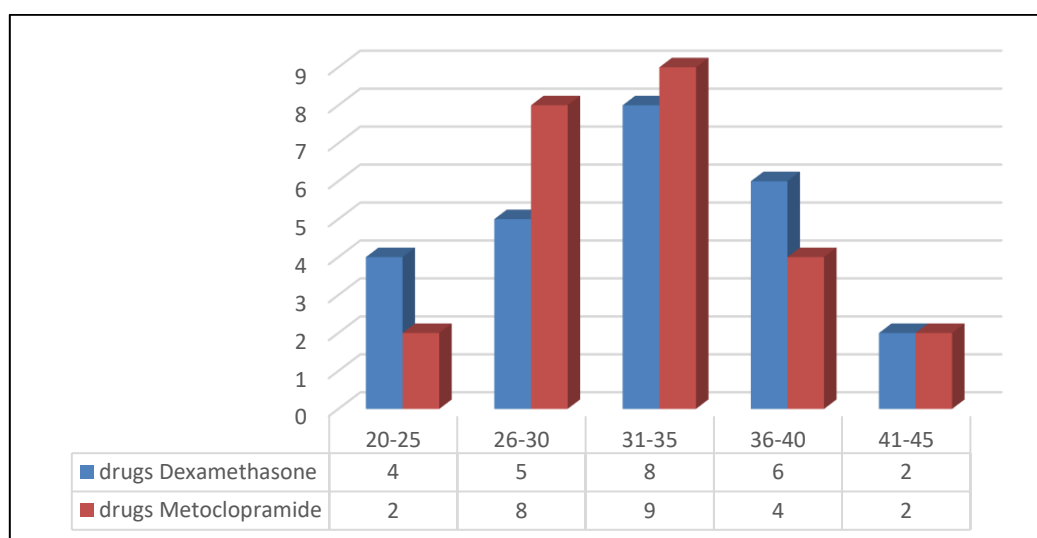


Figure 1. Age and type of drug used

Relationship between drug type and occurrence of postoperative nausea and vomiting (PONV) in women: The results clearly indicate a definitive relationship between the occurrence of postoperative nausea and vomiting (PONV) and the type of medication used among women as shown in Figure 2. Among those who experienced PONV, 11 women used Dexamethasone, while 7 women used Metoclopramide, suggesting that Dexamethasone was more commonly

used among those who suffered from PONV. Among the women who did not experience PONV, 14 used Dexamethasone, whereas 18 used Metoclopramide, indicating a higher usage of Metoclopramide in this group. The data shows that Dexamethasone was predominantly used by women who experienced PONV (11 compared to 7), whereas Metoclopramide was more frequently used by those who did not experience PONV (18 compared to 14). These results confirm a clear relationship between the type of medication administered and the occurrence of PONV after surgery.

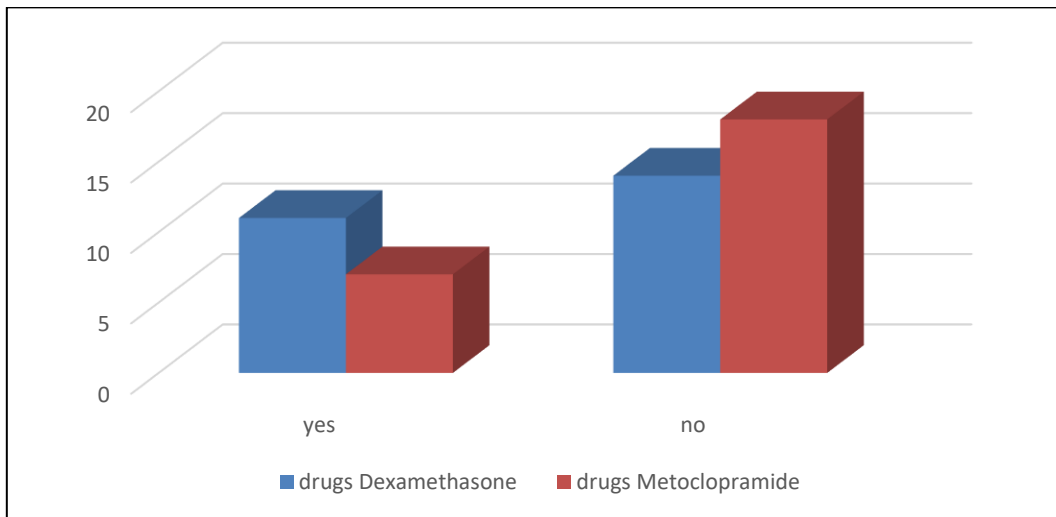


Figure 2. Incidence of PONV and type of drug used

Dosage preferences for dexamethasone and metoclopramide: These results indicate that the 8.00 mg dosage is exclusively associated with individuals using Dexamethasone (25 individuals), whereas the 10.00 mg dosage is exclusively associated with individuals using Metoclopramide (25 individuals) as in Figure 3. The data reveals that Dexamethasone is predominantly administered at a dosage of 8.00 mg, while Metoclopramide is primarily administered at a dosage of 10.00 mg. This distribution reflects clear preferences for specific dosages for each medication.

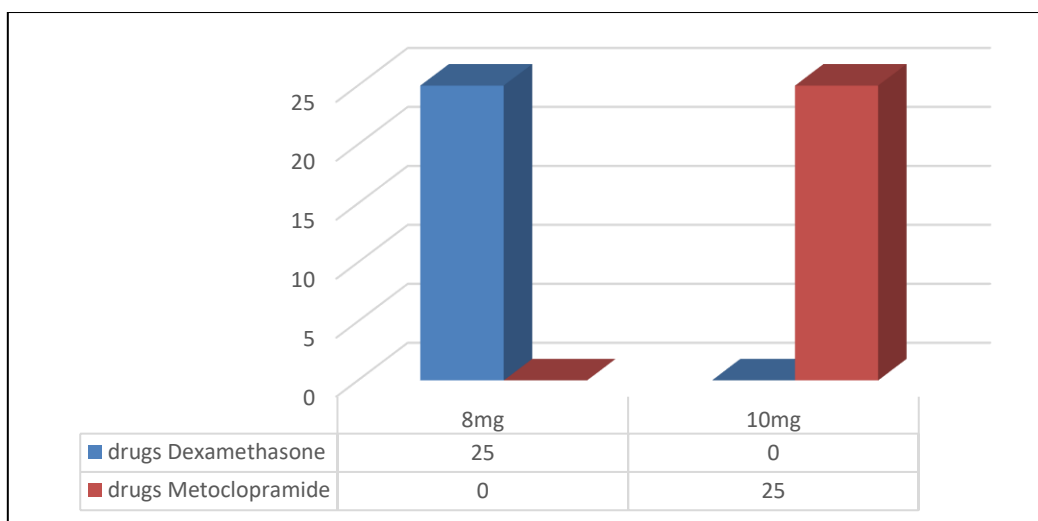


Figure 3. Dosage preferences for dexamethasone and metoclopramide

Drug Preferences Based on Previous Medical History: Individuals with Diabetes Mellitus (DM) tend to prefer Metoclopramide more, possibly due to better efficacy or response to the drug in managing their symptoms. Conversely, those with Hypertension (HTN) show a preference for Dexamethasone, indicating potentially better outcomes or comfort in managing their condition. For individuals with both Diabetes and Hypertension (DM-HTN), Metoclopramide is the preferred medication, reflecting its effectiveness in handling the complexities of having both chronic conditions. Meanwhile, individuals with no previous medical history (nothing) exhibit a balanced preference for both medications, indicating that both are effective under normal circumstances as in Figure 4.

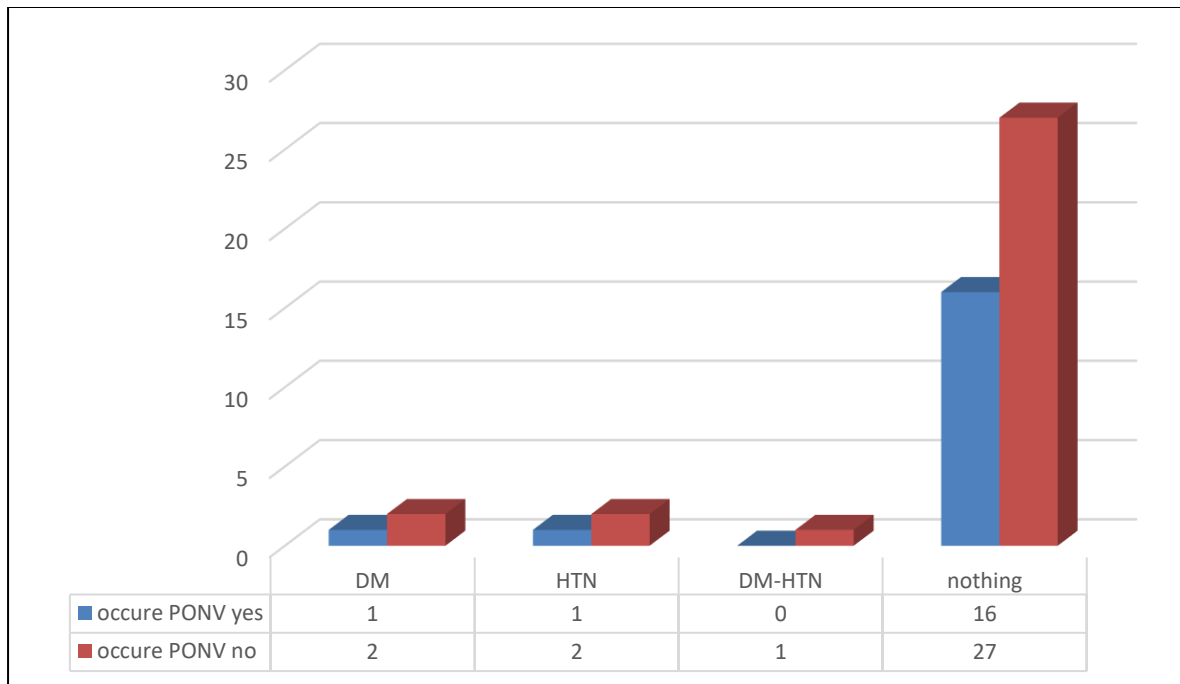


Figure 4. Drug Preferences Based on Previous Medical History

Correlation between drug type, dosage, and occurrence of postoperative nausea and vomiting (PONV): Table 2. Shows the correlation analysis results that indicate a significant relationship between the type of drug administered and the dosage, as evidenced by the strong positive Pearson correlation ($r = 0.886$, $p < 0.01$). However, when examining the relationship between the type of drug and the occurrence of postoperative nausea and vomiting (PONV), the Pearson correlation ($r = 0.167$) suggests a weak positive association, which is not statistically significant ($p = 0.247$). Despite the lack of statistical significance, there is an observed trend where certain medications may influence the likelihood of experiencing PONV.

Table 2. Correlation between drug type, dosage, and occurrence of postoperative nausea and vomiting (PONV)

Correlations		Age	Drugs	Dose	Occurrence of PONV	PMH
Age	Pearson Correlation	1	-.018-	-.072-	-.207-	-.048-
	Sig. (2-tailed)		.901	.627	.150	.740
Drugs	Pearson Correlation	-.018-	1	.886*	.167	-.048-

	Sig. (2-tailed)	.901		.000	.247	.741
Dose	Pearson Correlation	-.072-	.886**	1	.203	.080
	Sig. (2-tailed)	.627	.000		.166	.587
Occurrence of PONV	Pearson Correlation	-.207-	.167	.203	1	-.038-
	Sig. (2-tailed)	.150	.247	.166		.794
PMH	Pearson Correlation	-.048-	-.048-	.080	-.038-	1
	Sig. (2-tailed)	.740	.741	.587	.794	
**. Correlation is significant at the 0.01 level (2-tailed).						

DISCUSSION

The results indicate variations in drug usage among different age groups of women who underwent cesarean sections. For instance, women aged 31-35 years are the most frequent users of both Dexamethasone (47%) and Metoclopramide (53%), consistent with findings from Wrench, et al. (2018), which suggest that drug preferences differ by age, with distinct patterns of medication use emerging among various age groups. This study also found that older age groups tend to favor established medications, while younger groups are more inclined to try newer drugs. [9,16,17]

The study establishes a clear link between the type of medication used and the incidence of PONV. Among those who experienced PONV, 61% used Dexamethasone and 39% used Metoclopramide. Conversely, those who did not experience PONV had a higher usage of Metoclopramide (56%) compared to Dexamethasone (44%). This aligns study Amare Hailekrose (2018) Administration of prophylactic 10 mg metoclopramide remarkably reduced the incidence and severity of intraoperative and early postoperative nausea and vomiting compared group. [4]

The results show a distinct dosage preference for each drug, with Dexamethasone typically administered at 8.00 mg (100%) and Metoclopramide at 10.00 mg (100%). This mirrors the findings of Gan et al. (2016), which also noted the importance of dosage in drug efficacy. [11] Patients with Diabetes Mellitus (DM) tend to prefer Metoclopramide more (67%), potentially due to its better efficacy or patient response in managing symptoms, whereas those with Hypertension (HTN) show a preference for Dexamethasone (67%) for its superior management of their condition. For individuals with both Diabetes and Hypertension (DM-HTN), 100% used Metoclopramide. Individuals with no previous medical history show a balanced preference for both medications, with 51% using Dexamethasone and 49% using Metoclopramide. This supports Kovács et al. (2019), who found that patient medical history significantly influences drug preference and effectiveness. Their study also emphasized the need for careful monitoring of diabetic patients using Metoclopramide to avoid adverse drug interactions. [7]

The correlation analysis reveals a strong relationship between drug type and dosage ($r = 0.886$, $p < 0.01$), but a weak and not statistically significant relationship between drug type and PONV occurrence ($r = 0.167$, $p = 0.247$). Despite this, there is an observed trend that suggests certain medications might affect the likelihood of experiencing PONV. This is corroborated by Nancy Ekk (2023) Where administration of intravenous metoclopramide and intravenous dexamethasone after cord clamping during cesarean section under spinal anesthesia have been effective in reducing the incidence of nausea and vomiting. Dexamethasone being effective during cesarean section as well postoperatively [3].

Recent scholarly contributions within the Libyan medical landscape emphasize a multifaceted approach to improving surgical outcomes and healthcare delivery. In the realm of clinical practice and patient safety, recent assessments have highlighted the critical need for anesthesia providers to possess robust knowledge regarding the safe handling of emergency and anesthetic

drugs to mitigate perioperative risks [19]. This focus on pharmacological safety is further supported by evaluations of drug-induced complications, such as antibiotic-induced hepatotoxicity [20], and retrospective analyses of regional antibiotic resistance trends, which underscore the complexity of managing therapeutic protocols [23]. Furthermore, the push toward "Green Pharmacy" and the development of biodegradable drug delivery systems reflects an evolving commitment to enhancing therapeutic outcomes while reducing pharmaceutical environmental impact [24].

Complementing these clinical insights, structural improvements in the Libyan healthcare system are being driven by evaluations of institutional readiness for international accreditation [18] and the assessment of regional health services [25]. The integration of sustainable development principles [25] and advanced computational tools—such as machine learning for diagnosing chronic conditions and malignancies [22], [23]—is increasingly vital. Within this framework of advancing safety and efficiency, ensuring the privacy of healthcare data remains a foundational requirement [27]. Collectively, these studies provide a comprehensive backdrop for optimizing specialized protocols, such as the management of postoperative nausea and vomiting in obstetric anesthesia, by aligning pharmacological efficacy with broader systemic quality standards.

CONCLUSION

The study concluded that both dexamethasone and metoclopramide are effective options for preventing nausea and vomiting during and after cesarean deliveries performed under spinal anesthesia. However, the results demonstrated variations in efficacy based on drug type, dosage, and patient-specific factors such as Past medical history, Statistical analysis revealed a strong positive correlation between drug type and dosage ($p < 0.01$), with standard doses of 8 mg for dexamethasone and 10 mg for metoclopramide being the most commonly administered and effective in controlling symptoms. Nevertheless, the relationship between drug type and the occurrence of nausea and vomiting was weak and not statistically significant ($p = 0.247$), suggesting that other factors such as age, medical history, and individual physiological responses may influence outcomes. The study also found that metoclopramide was preferred among diabetic patients, whereas dexamethasone was favored by hypertensive patients, likely due to its anti-inflammatory properties highlighting the importance of considering pre-existing conditions in treatment selection. Furthermore, the findings support the potential benefits of combination therapy using both drugs to enhance symptoms control and reduce the need for additional antiemetics. Although this study has a number of limitations including the limited sample size and focuses on one medical center, which reduces the generalizability of the results, reliance on prospective medical records may lead to reporting bias or missing data, individual differences such as physiological responses and medical history are not fully controlled, the study focused on short-term results and did not include long-term follow-up for side effects or complications, and some intervening factors such as diet and psychological state were not taken into account; the study recommends the following:

- Individualized Treatment Plans: Tailor antiemetic selection based on patient-specific factors such as age, Past medical history, and comorbidities (e.g., diabetes or hypertension) to optimize efficacy and safety.
- Combination Therapy Approach: Consider combining dexamethasone and metoclopramide for improved control of postoperative nausea and vomiting (PONV) and reduced reliance on rescue medications, particularly in high-risk patients.
- Dosage Optimization: Administer dexamethasone (8 mg) and metoclopramide (10 mg) as standard prophylactic doses, ensuring proper dosage selection to enhance effectiveness while minimizing side effects.
- Preoperative Screening: Conduct thorough preoperative assessments to identify patients

at higher risk of PONV, allowing for proactive management strategies, including prophylactic antiemetic administration.

- **Monitoring and Follow-up:** Implement close postoperative monitoring to assess the effectiveness of the selected antiemetic and promptly address any adverse reactions or symptom recurrence.
- **Patient Education:** Provide patients with information on potential side effects, the expected outcomes of antiemetic therapy, and instructions for reporting any adverse effects during recovery.
- **Future Research:** Conduct larger-scale randomized controlled trials to confirm these findings, evaluate the long-term safety and efficacy of the studied drugs, and explore additional combinations or alternative antiemetic therapies.
- **Guideline Development:** Develop institutional protocols and guidelines for antiemetic use in cesarean deliveries under spinal anesthesia, ensuring consistency and evidence-based practices.

ABBREVIATIONS

IONV: Intraoperative Nausea and Vomiting; PONV: Postoperative Nausea and Vomiting; DM: Diabetes Mellitus; HTN: Hypertension

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AUTHOR CONTRIBUTIONS

AM, AY, HA and AAF conceived the idea and designed the study. AAW, DM, RH collected the data. AAW and DM analysed and interpreted the data. HA, AY, RH wrote the first draft of the manuscript. HA reviewed the manuscript draft. The author read and approved the final manuscript.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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