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Original Research Article

Evaluating the efficacy of Metoclopramide versus Dexamethasone and Metoclopramide for Prevention of Postoperative Nausea and Vomiting

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Name of Author:
Laiba Khalid[1], Tariq Abbasi[2],Sadia Qasim[3], Muhammad Bilal[4],Sakina Mustafa Gohar[5], Sareena Pathan[6]

Affiliation:
[1,2,5,6]*Ayub Teaching Hospital Abbottabad, Pakistan.*
[3,4]*Evercare Hospital Lahore, Pakistan.*

Corresponding Author:
Laiba Khalid
Email: laiba.kcti@gmail.com

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Abstract: **Objective:** To compare the efficacy of metoclopramide alone with dexamethasone and metoclopramide combination for prevention of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy. **Study Design:** A randomised controlled trial. **Place and Duration of Study:** Department of Anesthesiology Ayub Teaching Hospital Abbottabad from 5th May to 5th November 2025. **Methodology:** A total of 60 patients aged 20 to 60 years undergoing laparoscopic cholecystectomy were included and divided equally into two groups by blocked randomisation. Group A received metoclopramide 10 mg, while Group B received dexamethasone 4 mg with metoclopramide 5 mg intravenously before induction of anaesthesia. Patients were followed for nausea and vomiting during first 24 hours after surgery. Data was analysed using Statistical Package for the Social Sciences version 26. **Results:** Mean age was 43.50 ± 8.03 years in Group A and 42.60 ± 8.52 years in Group B, while mean body mass index was 25.52 ± 1.82 and 25.13 ± 1.87 kg/m^2 respectively. Efficacy was observed in 21 (70.0%) patients receiving metoclopramide alone compared with 25 (83.3%) receiving combination therapy. The difference was not statistically significant (p=0.360). **Conclusion:** Combination of dexamethasone and metoclopramide showed higher efficacy than metoclopramide alone, although the difference was not statistically significant.

Keywords: Dexamethasone, Laparoscopic cholecystectomy, Metoclopramide, Nausea, Postoperative complications, Vomiting

INTRODUCTION

Postoperative nausea and vomiting (PONV) is the most common and disconcerting postoperative complication across all types of surgery and a wide variety of patients.1 Specific types of surgery, anesthesia, and patient-related factors may explain the variation in incidence.2 This not only causes discomfort and prolongs recovery but also increases the risk for further complications like aspiration pneumonia, wound dehiscence, and electrolyte disturbances.3 The pathophysiology of PONV is multifactorial; several pathways are involved, which include but are not limited to the activation of serotonin, dopamine, and neurokinin receptors, and involve the chemoreceptor trigger zone (CTZ) of the brain.4 Among drugs, the commonly used agent for the prevention and treatment of PONV is the antagonist of the dopamine receptor known as metoclopramide. Metoclopramide prevents emesis through a block on the dopamine receptors within the CTZ, regarded as a pivotal area of the brain where emetic actions initiate, particularly dopamine receptors.5 Other properties of this medication include increasing gastrointestinal motility as a consequence of action through the 5-HT4 receptors in the gut, therefore allowing gastric emptying to progress.6 All these mechanisms of action combined make metoclopramide a very useful drug in the management of PONV, particularly after abdominal surgeries where delayed gastric emptying

contributes to symptoms.7

Having become effective and well-tolerated, a corticosteroid called dexamethasone attained an indispensable position within multimodal antiemetic regimens of PONV.8 According to several studies, the effect of the investigated compound in cases of nausea/vomiting is through inhibition of prostaglandin synthesis and its impact on membrane stabilization in the stomach and gut.9 In addition, dexamethasone suppresses central sensitization in the vomiting reflex.10 Studies also have established that dexamethasone acts best when given preoperatively and is able to bring down early and late PONV significantly.11 It is also used in combination with other antiemetics, either metoclopramide or ondansetron, in a multimodal approach for prevention of nausea in high-risk patients.11. While both metoclopramide and dexamethasone have shown antiemetic efficacy individually, their combined effect has been suggested to provide superior outcomes. However, despite international studies supporting this combination, there is a lack of local research addressing its effectiveness in the context of our patient population and healthcare settings. This study aims to fill this gap by evaluating the efficacy of metoclopramide alone versus its combination with dexamethasone for PONV prevention, providing evidence-based recommendations tailored to local clinical practices.

METHODOLOGY

This randomised controlled trial was conducted from 5th May 2025 to 5th November 2025 in the Department of Anesthesiology, Ayub Teaching Hospital, Abbottabad. A total of 60 patients undergoing laparoscopic cholecystectomy were enrolled in the study. The sample size was calculated by Open EPI online calculator, with 80% power and 96% confidence interval, considering anticipated efficacy of 38% with metoclopramide alone and 74% with dexamethasone and metoclopramide combination for prevention of postoperative nausea and vomiting.12 Patients were recruited through non-probability consecutive sampling and were allocated into 2 equal groups by blocked randomisation. Group A included 30 patients who received metoclopramide alone, while Group B included 30 patients who received dexamethasone and metoclopramide combination. The study was conducted after approval from the hospital ethics committee. Written informed consent was obtained from all patients before their enrolment. The purpose of the study, procedure of treatment, confidentiality of collected information and absence of significant expected risks were explained to the participants.

Patients aged 20 to 60 years of either gender, scheduled for laparoscopic cholecystectomy and classified as ASA I/II were included. Patients having history of GI disorders including reflux or peptic ulcers, pregnant or lactating women, history of motion sickness or prior PONV, significant CVS, renal, hepatic or respiratory comorbidities, history of substance abuse or alcohol dependency, use of medications interfering with anesthesia or study drugs such as opioids or antidepressants, and abnormal pre-operative laboratory findings such as electrolyte imbalance were excluded.

After informed consent, baseline demographic information was recorded on a specially designed proforma. The information included age, gender, BMI, socioeconomic status, educational attainment, ASA grade and residential status. Eligible patients were divided into 2 groups by blocked randomisation. Patients in Group A received Metoclopramide 10 mg, whereas patients in Group B received Dexamethasone 4 mg and Metoclopramide 5 mg. The allocated drugs were prepared in 3 ml coded syringes and administered intravenously 30 minutes before induction of anesthesia. Anesthesia was induced with Propofol 1.5–2.5 mg/kg and Succinylcholine 2 mg/kg. Anaesthesia was maintained with Oxygen and Isoflurane at 1 MAC, while Atracurium was used for muscle relaxation. No additional medications were permitted during or after the surgical procedure. Patients were followed postoperatively for Post-Operative Nausea and Vomiting (PONV) at 1, 2, 4, 6, 12, 18 and 24 hours after surgery. Postoperative nausea and vomiting was considered present when either nausea or vomiting occurred during the first 24 hours after surgery. Nausea was considered when the patient experienced an urge to vomit lasting for 15 minute within the first 24 hours. Vomiting was considered as forceful expulsion of gastric contents through the mouth and repeated episodes occurring within a 2-minute interval were counted as a single event. Efficacy was considered when there was absence of nausea and vomiting during the first 24 hour after surgery. The collected data was analysed using IBM SPSS version 26. Categorical variables including gender, socioeconomic status, educational attainment, residential status, ASA classification and efficacy were presented as frequencies and percentages. Continuous variables including age and BMI were expressed as Mean ± SD. Efficacy between Group A and Group B was compared using Fisher's exact test. Stratification was performed for age, gender, BMI and ASA classification to assess their effect on efficacy followed by Fisher's exact test. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 60 patients was included in the study and was equally divided into two groups of 30 patients each. In Group A (Metoclopramide), the mean age was 43.50 ± 8.03 years whilst in Group B (Dexamethasone + Metoclopramide), mean age was 42.60 ± 8.52 years. Mean BMI in Group A and Group B was 25.52 ± 1.82 kg/m^2 and 25.13 ± 1.87 kg/m^2 respectively. Regarding gender distribution, males constituted 10 (33.3%) and 11 (36.7%) patients in Group A and Group B respectively, whereas females were 20 (66.7%) in Group A and 19 (63.3%) in Group B. With respect to socioeconomic status, low income patients was 13 (43.3%) in Group A and 11 (36.7%) in Group B, middle income patients was 13 (43.3%) in Group A and 15 (50.0%) in Group B, and high income patients was 4 (13.3%) in both groups. Concerning educational level, uneducated patients was 7 (23.3%) and 6 (20.0%) in Group A and Group B respectively, primary level education was found in 15 (50.0%) and 9 (30.0%) patients, secondary level in 5 (16.7%) and 10 (33.3%) patients, and higher education in 3 (10.0%) and 5 (16.7%) patients. As regards residence, rural patients was 19 (63.3%) in Group A and 18 (60.0%) in Group B, whilst urban patients was 11 (36.7%) and 12 (40.0%) respectively. Regarding ASA classification, ASA Class I patients was 21 (70.0%) in Group A and 25 (83.3%) in Group B, and ASA Class II patients was 9 (30.0%) in Group A and 5 (16.7%) in Group B (Table 1).

Table 1. Patient demographics in both groups n=60

Variables	Metoclopramide n=30	Dexamethasone + Metoclopramide n=30
	Mean ± SD	**Mean ± SD**
Age (years)	43.50 ± 8.03	42.60 ± 8.52
BMI (Kg/m^2)	25.52 ± 1.82	25.13 ± 1.87
	n (%)	**n (%)**
Gender		
Male	10 (33.3%)	11 (36.7%)
Female	20 (66.7%)	19 (63.3%)
Socioeconomic Status		
Low	13 (43.3%)	11 (36.7%)
Middle	13 (43.3%)	15 (50.0%)
High	4 (13.3%)	4 (13.3%)
Educational Level		
Uneducated	7 (23.3%)	6 (20.0%)
Primary	15 (50.0%)	9 (30.0%)
Secondary	5 (16.7%)	10 (33.3%)
Higher	3 (10.0%)	5 (16.7%)
Residence		
Rural	19 (63.3%)	18 (60.0%)
Urban	11 (36.7%)	12 (40.0%)
ASA Class		
I	21 (70.0%)	25 (83.3%)
II	9 (30.0%)	5 (16.7%)

When efficacy of antiemetic treatment was compared between both groups, it was found that treatment was effective in 21 (70.0%) patients of Group A and 25 (83.3%) patients of Group B, whereas treatment remained ineffective in 9 (30.0%) patients of Group A and 5 (16.7%) patients of Group B. The difference between both groups was however not statistically significant (p=0.360) (Table 2).

Table 2. Comparison of efficacy between the two groups. n=60

Efficacy	Group A (Metoclopramide) n=30 n (%)	Group B (Dexamethasone + Metoclopramide) n=30 n (%)	P value
Yes	21 (70.0%)	25 (83.3%)	0.360*
No	9 (30.0%)	5 (16.7%)	
Total	30 (100%)	30 (100%)	

**Fischer Exact test*

On stratified analysis, no statistically significant association was noted between treatment efficacy and any of the demographic variables including age, gender, BMI, and ASA class in either group. Amongst patients aged >40 years, efficacy was numerically higher in Group B (88.9%) as compared to Group A (70.6%), though this difference did not reach statistical significance (p=0.228). Similarly, in female patients, efficacy was higher in Group B (94.7%) than Group A (85.0%) but was again not significant (p=0.605) (Table 3).

Table 3. Association of efficacy with demographic variables

Demographic Variables	Group	Yes n (%)	No n (%)	P-value
Age (years)	**≤40**			
	A	9 (69.2%)	4 (30.8%)	1.000*
	B	9 (75.0%)	3 (25.0%)	
	>40			
	A	12 (70.6%)	5 (29.4%)	0.228*
	B	16 (88.9%)	2 (11.1%)	
Gender	**Male**			
	A	4 (40.0%)	6 (60.0%)	0.395*
	B	7 (63.6%)	4 (36.4%)	
	Female			
	A	17 (85.0%)	3 (15.0%)	0.605*
	B	18 (94.7%)	1 (5.3%)	
BMI (Kg/m^2)	**≤25**			
	A	12 (70.6%)	5 (29.4%)	0.698*
	B	11 (78.6%)	3 (21.4%)	
	>25			
	A	9 (69.2%)	4 (30.8%)	0.364*
	B	14 (87.5%)	2 (12.5%)	
ASA Class	**I**			
	A	15 (71.4%)	6 (28.6%)	0.475*
	B	21 (84.0%)	4 (16.0%)	
	II			
	A	6 (66.7%)	3 (33.3%)	1.000*
	B	4 (80.0%)	1 (20.0%)	

***Fisher Exact Test**

DISCUSSION

Overall the combination regimen was found to be more efficacious as it was effective in 25 (83.3%) patients as compared to 21 (70.0%) patients in Metoclopramide alone group, however this difference was not statistically significant (p=0.360). This finding suggest that addition of Dexamethasone to Metoclopramide may provide some added clinical benefit, which is likely because Dexamethasone act through inhibition of prostaglandin synthesis and reduction of central serotonin release, thereby complementing the dopamine receptor blocking mechanism of Metoclopramide and producing a broader antiemetic effect through dual pathway inhibitions.

When efficacy was assessed across demographic subgroup no statistically significant association was found with age, gender, BMI, or ASA class in either group. However, it was observed that patients aged more than 40 years in Group B showed numerically higher efficacy of 88.9% as compared to 70.6% in Group A, which may be attributed to the fact that older patients tend to have relatively suppressed inflammatory response and altered neurotransmitter sensitivity making them potentially more responsive to the anti-inflammatory mechanism of Dexamethasone.

The finding of higher efficacy in the combination group (83.3%) as compared to Metoclopramide alone group (70.0%) is in agreement with several

published studies. Afzal et al. 13 reported total PONV frequency of 62% with Metoclopramide alone versus 26% with the combination, demonstrating a substantially greater difference than what was observed in the present study, which may be because Afzal et al. 13 assessed PONV across three separate time intervals up to 24 hours and used a lower dose of Metoclopramide (5 mg) in the combination group, thereby making the monotherapy arm comparatively weaker. Similarly, Ahmad et al. 14 reported that 65 (86.7%) patients in the combination group had no nausea or vomiting as compared to 49 (65.3%) in the Metoclopramide alone group (P=0.002), which closely resembles the efficacy trend seen in present study, suggesting that addition of Dexamethasone consistently enhances the antiemetic effect of Metoclopramide regardless of surgical type. Rehman et al. 15 also noted PONV in only 7 (14.3%) patients with combination therapy versus 15 (30.6%) with Metoclopramide alone, though the difference narrowly failed to reach statistical significance (P=0.053), which is comparable to the non-significant result (P=0.360) obtained in present study, and this similarity may be attributed to relatively small sample sizes in both studies reducing the statistical power to detect true differences. Thanoun et al. 16 further supported these findings by reporting total 24-hour PONV of 15% with the combination versus 47% with Metoclopramide alone, with the combination also producing zero rescue antiemetic requirement, reinforcing that dual-pathway blockade through dopaminergic and anti-inflammatory mechanisms provides superior prophylaxis than Metoclopramide alone.

Further support for combination therapy was provided by Alkaissi et al. 17 who found that vomiting occurred in only 6 (20%) patients in the combination group as compared to 6 (20%) with Dexamethasone alone and 17 (56.7%) with placebo (P=0.0037), and that mean nausea intensity was lowest with combination therapy (1.05 ± 0.90) compared to Metoclopramide alone (2.43 ± 1.03), which indicates that not only frequency but also severity of PONV is reduced with the combination. Entezariasl et al. 18 likewise reported nausea in only 8% and vomiting in 0% with combination therapy at 24 hours as compared to 20% nausea and 4% vomiting with Metoclopramide alone, and this consistent pattern across different surgical settings suggest that the synergistic action of Dexamethasone in suppressing central serotonin turnover alongside the dopamine-blocking action of Metoclopramide produces a broader and more durable antiemetic effect. Naghibi et al. 19 reported PONV in only 2 (6.1%) children in the combination group as compared to 6 (18.2%) in the Metoclopramide group during 6–24 hours postoperatively, and although this study was conducted in paediatric patients undergoing strabismus surgery which is a quite different population from the present study, the directional finding of superiority of combination therapy remains consistent. Orewole et al. 20 further demonstrated that complete response was achieved in 32 (88.9%) patients with combination therapy versus 20 (55.6%) with controls (P=0.002), with PONV occurring in only 4 (11.1%) versus 16 (44.4%) patients (P=0.003), providing strong evidence that addition of Metoclopramide to Dexamethasone significantly reduces PONV, which by extension supports the rationale of combining both drugs as done in present study.

However, not all studies was in agreement with these findings. Frikha et al. 21 reported that adding Metoclopramide 10 mg to Dexamethasone 8 mg did not improve emetic symptoms during intraoperative or postoperative period, with complete response achieved in 83% of Dexamethasone-only group and 86% of combination group, suggesting no meaningful additive benefit. This contrasting finding may be explained by the fact that Frikha et al. 21 studied parturient women undergoing caesarean section under spinal anaesthesia, a setting where baseline emetogenic stimulus and hormonal milieu is quite different from general surgical patients, and where Dexamethasone alone may already achieve near-ceiling antiemetic effect leaving little room for additional benefit from Metoclopramide. Similarly, Tobi et al. 22 found that Dexamethasone alone was associated with highest early PONV incidence at 40% (P=0.003), whilst Metoclopramide alone produced early PONV in 29.97% and late PONV in 26.6%, with the combination demonstrating better overall effect than Metoclopramide alone, which is consistent with findings of present study. Alshami et al. 23 reported that among women experiencing PONV, 11 had received Dexamethasone and 7 had received Metoclopramide, suggesting that Metoclopramide performed comparatively better, though the association between drug type and PONV was weak and non-significant (r=0.167, P=0.247), which again parallels the non-significant result of present study. Ali et al. 24 concluded from their comparative literature analysis that Ondansetron and Droperidol were more effective than Metoclopramide for prevention of postoperative vomiting, with Dexamethasone also reducing vomiting (P<0.03), and whilst this finding does not directly contradict present study results, it does suggest that Metoclopramide-based regimens may be inferior to newer serotonin antagonists and that the modest efficacy improvement seen with combination in present study might be further enhanced by substituting or supplementing with Ondansetron.

There exist various limitations of the current study which must be considered. Firstly, the current study is limited in terms of its location since it was carried out in just one single institution and thus its results cannot be generalized to the wider population.

Secondly, the number of participants was quite small in each group, with 30 patients in each group.

CONCLUSION

This current study demonstrates that the use of dexamethasone and metoclopramide together is better than the use of metoclopramide alone in the prevention of post-operative nausea and vomiting even though no statistical significance was seen in the results obtained. This implies that dexamethasone when used alongside metoclopramide might bring about clinically significant effects due to their working through different mechanisms at the same time.

Ethical Approval

Ethical permissions for conducting the study was taken from the Institutional Ethical Committee of the concerned hospital before starting the research works.

Patients' Consent

Written informed consent was taken from all the participant before their inclusion in the study.

Competing Interests

The authors declared that there was no conflict of interest associated with this research

REFERENCES

1. Timerga S, Befkadu A. Prevalence and associated factors of postoperative nausea and vomiting among adult patients undergoing elective surgery. Ann Med Surg. 2024;86(3):1304-8.
2. Sinha V, Vivekanand D, Singh S. Prevalence and risk factors of postoperative nausea and vomiting in a tertiary-care hospital: a cross-sectional observational study. Med J Armed Forces India. 2022;78(Suppl 1):S158-62.
3. Scott MJ, Aggarwal G, Aitken RJ, Anderson ID, Balfour A, Foss NB, et al. Consensus guidelines for perioperative care for emergency laparotomy enhanced recovery after surgery (ERAS®) society recommendations part 2-emergency laparotomy: intra- and postoperative care. World J Surg. 2023;47(8):1850-80.
4. Gloor Y, Czarnetzki C, Curtin F, Gil-Wey B, Tramèr MR, Desmeules JA. Genetic susceptibility toward nausea and vomiting in surgical patients. Front Genet. 2022;12:816908-11.
5. Heckroth M, Luckett RT, Moser C, Parajuli D, Abell TL. Nausea and vomiting in 2021: a comprehensive update. J Clin Gastroenterol. 2021;55(4):279-99.
6. Camilleri M, Atieh J. New developments in prokinetic therapy for gastric motility disorders. Front Pharmacol. 2021;12:711500-5.
7. Ebrahimian M, Mirhashemi SH, Oshidari B, Zamani A, Shadidi-Asil R, Kialashaki M, et al. Effects of ondansetron, metoclopramide and granisetron on perioperative nausea and vomiting in patients undergone bariatric surgery: a randomized clinical trial. Surg Endosc. 2023;37(6):4495-504.
8. Xu N, Jiang K, Liu L, Chen L. Efficacy and safety of intraperitoneal dexamethasone on postoperative nausea and vomiting following laparoscopy: study protocol for a systematic review and meta-analysis. BMJ Open. 2023;13(11):e070371-6.
9. Shama AAA, Elsayed AA, Albraithen AA, Arafa SK. Effect of dexmedetomidine, dexamethasone, and ondansetron on postoperative nausea and vomiting in children undergoing dental rehabilitation: a randomized controlled trial. Pain Physician. 2023;26(1):1-11.
10. Celio L, Cortinovis D, Cogoni AA, Cavanna L, Martelli O, Carnio S, et al. Exploratory analysis of the effect of a dexamethasone-sparing regimen for prophylaxis of cisplatin-induced emesis on food intake (LUNG-NEPA study). Sci Rep. 2023;13(1):1257-9.
11. Bansal T, Singhal S, Taxak S, Bajwa SJS. Dexamethasone in anesthesia practice: a narrative review. J Anaesthesiol Clin Pharmacol. 2024;40(1):3-8.
12. Amer M, Uddin S, Rasheed F. Comparison of use of metoclopramide alone and in combination with dexamethasone for prevention of postoperative nausea and vomiting in laparoscopic cholecystectomy. Pak J Med Health Sci. 2012;6(3):626-8.
13. Afzal MA, Babar F, Babar A. A comparative study of metoclopramide alone and in mixture with dexamethasone for deterrence of postoperative nausea and vomiting after laparoscopic cholecystectomy. Indo Am J Pharm Sci. 2020;7(8):1001-4. doi: 10.5281/zenodo.4009333.
14. Ahmad H, Bibi S, Aslam S, Sagheer A. Comparison of metoclopramide-dexamethasone combination and metoclopramide alone for prophylaxis of postoperative nausea vomiting in laparoscopic cholecystectomy. J Univ Med Dent Coll. 2023;14(1):556-9. doi: 10.37723/jumdc.v14i1.668.
15. Rehman A, Wadud R. Comparison of postoperative nausea and vomiting in metoclopramide alone and combination of metoclopramide with dexamethasone in patients undergoing laparoscopic cholecystectomy. Indus J Biosci Res. 2025;3(4):1208-12. doi: 10.70749/ijbr.v3i4.2759.
16. Thanoun AN, Wahid MA, Salih IK, Ibraheem SA-K. The impact of prophylactic dexamethasone, metoclopramide or both on nausea and vomiting after laparoscopic cholecystectomy. Al-Kindy Col Med J. 2019;15(2):69-75. doi: 10.47723/kcmj.v15i2.168.
17. Alkaissi A, Dwaikat M, Almasri N. Dexamethasone, metoclopramide, and their combination for the prevention of postoperative

nausea and vomiting in female patients with moderate-to-high risk for PONV undergoing laparoscopic surgery. J Evol Med Dent Sci. 2017;6(75):5353-9. doi: 10.14260/Jemds/2017/1162.

18. Entezariasl M, Khoshbaten M, Isazadehfar K, Akhavanakbari G. Efficacy of metoclopramide and dexamethasone for postoperative nausea and vomiting: a double-blind clinical trial. East Mediterr Health J. 2010;16(3):300-3. doi: 10.26719/2010.16.3.300.
19. Naghibi KH, Hashemi SJ, Montazari K, Nowrozi M. Comparison of metoclopramide, dexamethasone and their combination for prevention of postoperative nausea and vomiting in strabismus surgery. Med J Islamic World Acad Sci. 2000;13(1):31-3.
20. Orewole OT, Aremu SK, Bolaji BO, Kolawole IK. Comparative trial of combined metoclopramide and dexamethasone versus dexamethasone in postoperative nausea and vomiting in gynaecological surgery. Am J Res Commun. 2014;2(5):213-57.
21. Frikha M, Dhouib F, Bouhlel R, Djemel W, Smaoui L, Karoui A. Combined use of metoclopramide and dexamethasone as a prophylactic antiemetic in elective cesarean section under spinal anesthesia. Middle East J Anaesthesiol. 2012;21(6):829-34.
22. Tobi KU, Imarengiaye CO, Amadasun FE. The effects of dexamethasone and metoclopramide on early and late postoperative nausea and vomiting in women undergoing myomectomy under spinal anaesthesia. Niger J Clin Pract. 2014;17(4):449-55. doi: 10.4103/1119-3077.134036.
23. Alshami HA, Hussein MSE, Jadullah DAS, Elmesmari AAY, Saleh SM, Mustafa AM, et al. A comparison between antiemetic metoclopramide and dexamethasone in cesarean section under spinal anesthesia. Sci J Publ Health Res Technol. 2026;2(2):1-11. doi: 10.65420/sjphrt.v2i2.109.

24. Ali AH. Comparison of drugs and intravenous crystalloid in reduction of postoperative nausea and vomiting after laparoscopic surgery. World J Laparosc Surg. 2008;1(1):29-34.