- **TITLE**: **A prospective, Randomized, Single Blind Study on the Efficacy of Varying Doses of Dexamethasone in Preventing Postoperative Nausea and Vomiting in Adult Elective Surgery Patients at Tikur Anbessa Specialized Hospital (2024-2025)**

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Research thesis to be submitted to the department of Anesthesiology, Critical Care and Pain Medicine, school of Medicine in Partial fulfilment of the requirements for the award of a specialty certificate in anesthesiology, critical care and pain medicine in, college of health science, Addis Ababa

A prospective, Randomized, Single Blind Study on the Efficacy of Varying Doses of Dexamethasone in Preventing Postoperative Nausea and Vomiting in Adult Elective Surgery Patients at Tikur Anbessa Specialized Hospital (2024-2025)

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APPROVAL SHEET

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I, the undersigned anesthesiology, critical care and pain medicine resident, declare that I have submitted my original work titled **A prospective, Randomized, Single Blind Study on the Efficacy of Varying Doses of Dexamethasone in Preventing Postoperative Nausea and Vomiting in Adult Elective Surgery Patients at Tikur Anbessa Specialized Hospital (2024-2025)**

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Abstract

Background: Postoperative nausea and vomiting (PONV) is a common and distressing complication following surgery. Dexamethasone is widely used as a prophylactic antiemetic, though the optimal dose remains unclear. This study aimed to assess the efficacy of two doses of dexamethasone (4 mg vs. 8 mg) in preventing PONV among adult elective surgical patients.

Objective to evaluate effectiveness and safety of different dose of dexamethasone for prevention of postoperative nausea and vomiting in TASH

Methods: A prospective, randomized, single-blind study was conducted at Tikur Anbessa Specialized Hospital to evaluate the efficacy of two doses of dexamethasone in the prevention of postoperative nausea and vomiting (PONV). With sample size of 110 Adult patients scheduled for elective surgery were randomly assigned to receive either 4 mg or 8 mg of intravenous dexamethasone after induction of anesthesia. The incidence and severity of PONV in both group were assessed over a 24-hour postoperative period. Categorical data were analyzed using the Chi-square test, and binary logistic regression used to assess association with potential cofounders. with a p-value of < 0.05 considered statistically significant. All statistical analyses were performed using SPSS version 25.

Results: The rate of PONV occurred in 49.1% of patients who received 4 mg dexamethasone and 43.6% of those who received 8 mg and Patients who took 8mg of dexamethasone had lower likelihood of developing PONV(AOD=0.54,95%CI;0.25-1.16),although the incidence is lower in high dose group the difference was not statistically significant(p value 0.324). However surgery duration exceeding 3hour was significantly associated with increased odds of PONV (AOR 4.6,95 %CI; .76-28.15 P-0.046).

Conclusion: Both 4 mg and 8 mg doses of dexamethasone were similarly effective in reducing the incidence of PONV, with no statistically significant difference between the two. The finding suggest that a 4mg dose may be sufficient for routine prophylaxis.

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Then, I would like to express my great gratefulness towards those authors and researchers of articles, and online information for the valuable works, I had read and cited in my research proposal writing. And finally, I would like to thank my fellow friends for helpful discussions and idea along the way.

List of figures and tables

List of Acronyms

AAU	Addis Ababa University
ACCPM	Anesthesiology, critical care and pain medicine
ASA	American society of anesthesia
D2	Dopamine 2
DM	Diabetes mellitus
GA	General Anesthesia
GERD	Gastroesophageal reflex disease
H1	Histamine 1
M1	Muscarinic 1
NK2	Neurokinin 2
OR	Operation Room
PACU	Post Anesthesia Care Unit
PONV	Postoperative Nausea Vomiting
Spss	Statistical Package for the Social Sciences
TASH	Tikur Anbessa Specialized Hospital

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1 Introduction

1.1 Background

PONV (postoperative nausea and vomiting) generally refers to nausea or vomiting that occurs within the first 24 hours postoperatively, affecting 30% to 80% of patients, depending on the type of surgery, anesthesia choice, and patient characteristics(1). Untreated PONV predisposes patients to numerous complications, such as pulmonary aspiration, wound dehiscence, psychological distress, increased intracranial pressure, esophageal rupture, pneumothorax, and delayed recovery and discharge times.(1) Various pharmacologic agents have been tested for the treatment of postoperative nausea and vomiting, with dexamethasone being one of the commonly used corticosteroids. Its safety profile and low cost make it a great choice for PONV management, and it has been shown to significantly reduce PONV (2).

However, there is ongoing debate regarding different dosing regimens to maximize its effectiveness. Current guidelines suggest a dose ranging from 4 mg to 10 mg. Some studies indicate that lower doses can be as effective as higher doses, while others suggest that higher doses provide better outcomes in specific groups of patients. Given this variability, there is a critical need for well-designed studies to determine which dose is more effective in preventing PONV

1.2 Statement of the problem

Postoperative nausea and vomiting (PONV) is a common and distressing complication of surgical procedures. Globally, its prevalence is estimated to range from 30% to 80%. According to local research, the prevalence is approximately 21%to 45%. Although advancements in anesthetic techniques and the use of various antiemetic agents have significantly reduced the incidence of PONV, it remains a persistent issue, particularly among high-risk patients. Dexamethasone, a corticosteroid with antiemetic properties, has been shown to reduce the prevalence of PONV. However, the optimal prophylactic dose of dexamethasone has not yet been established.

Current clinical practice often involves the use of dexamethasone without clear evidence of a dose-response relationship. This uncertainty may lead to suboptimal outcomes—either through under dosing, which results in inadequate prevention of PONV, or overdosing, which increases the risk of undesirable side effects. Moreover, variability in patient populations, types of surgical procedures, anesthetic techniques, and surgical durations further complicates the effective use of dexamethasone in PONV management.

This research aims to address the existing knowledge gap regarding the efficacy and safety of dexamethasone in PONV prevention. By systematically evaluating different dexamethasone doses, the study seeks to identify the optimal dose that provides maximum therapeutic benefit with minimal side effects. Establishing an evidence-based dosing strategy for dexamethasone will contribute to improved postoperative care and enhance overall patient outcomes

1.3 Significance of the study

1 Reduction of health care cost PONV leads to increased hospital stay which result in increased hospital resource usage additional medical interventions and financial burden on patients. This research could contribute to decreased healthcare costs by effectively reducing PONV by appropriate dosing.

2 addressing variability in practice there is significant variability in usage of dexamethasone for POVN. This study will provide ample data to guide clinical decision making and standardize treatment protocol. And reduce discrepancy

3 contribute to existing literature, guidance for future research. Evidence based dexamethasone dosing into them can further optimize patient recovery.

2 Literature review

2.1 Introduction

Postoperative nausea and vomiting is surgical complication defined as nausea and vomiting occurring in first 24-hour post-surgical procedure. (1) Nausea is unpleasant sensation and urge to vomit. Vomiting is forceful expulsion of gastric content through mouth (2).it can lead to pulmonary aspiration, increased hospital admission, patient dissatisfaction and delayed recovery (2).

2.2 Incidence

A review of various studies highlights the prevalence and risk factors associated with postoperative nausea and vomiting (PONV). According to Pierre and Whelan, the general prevalence of PONV is approximately 30% among all postoperative patients, rising to 80% in high-risk individuals (1). A prospective cohort study in Porto, Portugal, found a 34% incidence of PONV within 24 hours post-surgery (3).

In Tanzania, a study by Chalya et al. reported a PONV incidence of 41.4%, identifying key risk factors such as being aged 21–30, female gender, a history of PONV, general anesthesia, and intraoperative pethidine use(4). A cross-sectional study in Ethiopia at Debre Berhan referral hospital evaluated 398 patients, revealing PONV incidences of 19.85% for nausea, 4.02% for vomiting, and 21.86% for both. Identified risk factors included a history of motion sickness, female sex, previous PONV, and the duration of anesthesia (5). Another local study at the University of Gondar found a 17.2% incidence of nausea and vomiting within 24 hours post-operation among 355 adult surgical patients (6).

2.3 dose of Dexamethasone

Dexamethasone is one of the prophylactic drugs used for prevention of PONV. The single agent usage of Dexamethasone for POVN results in significant reduction of this side effect in

dexamethasone vs placebo Cochrane review of 125 RCTs(n=2,271 patient found single dose of dexamethasone decreased PONV by 26% compared to placebo(RR 0.74,95% CI 0.7-0.79)(9).

When considering the dose of dexamethasone used for the prevention of PONV A systematic review of randomized clinical trials assessed the effectiveness of dexamethasone in preventing postoperative nausea and vomiting (PONV). The review found that doses ranging from 4 mg to 5 mg significantly reduced the incidence of PONV within 24 hours compared to a control group. When this dose was combined with a second antiemetic, it further enhanced the reduction in PONV. Similarly, higher doses of 8 mg to 10 mg also showed a decrease in PONV compared to the control, and this effect was amplified when paired with another antiemetic. However, the analysis indicated potential publication bias for the higher dose group. Notably, direct comparisons revealed no significant clinical advantage of the higher dosing regimen over the lower one in preventing PONV (10).

Another study done by yamanaga et al examined donor baseline variables and operative outcomes among groups receiving different doses of dexamethasone. While the groups were largely similar, the low-dose dexamethasone group contained more women, attributed to certain anesthesiologists' tendencies to administer low-dose dexamethasone to women at higher risk for postoperative nausea and vomiting (PONV). Postoperative complications were minimal and comparable across the groups, with the high-dose group experiencing no complications, while the low and control groups recorded a few minor issues, all classified as below grade II on the Clavien-Dindo scale.

In terms of PONV, high-dose dexamethasone significantly reduced its incidence by 28% compared to the control group, whereas the low dose did not demonstrate a beneficial effect. The majority of PONV episodes occurred within six hours following the low-dose administration. Statistical analysis showed that only high-dose dexamethasone effectively decreased the number of PONV episodes, highlighting its efficacy in managing this complication postoperatively.

Postoperative pain management was also assessed, revealing that a single injection of high-dose dexamethasone significantly reduced total opioid consumption within 24 hours compared to controls. However, the total doses of ketorolac and acetaminophen did not differ significantly across groups. Propensity-score matching for age, sex, and BMI reaffirmed the original findings,

showing that high-dose dexamethasone led to lower PONV incidence and reduced opioid consumption, further supporting its role in enhancing postoperative care (11).

In a prospective, randomized, double-blind, placebo-controlled study by fujii et al , 75 patients, 20 men and 55 women, received intravenously placebo or dexamethasone at 2 different doses (4 and 8 mg) (n 25 of each) at the end of surgery. A standard general anesthetic technique was used. PONV and analgesic requirements were evaluated. Five patients, consisting of two men and three women, were excluded from the study based on predefined exclusion criteria. The remaining treatment groups were comparable in terms of patient demographics. Among the results, 64% of patients receiving dexamethasone 4 mg experienced postoperative nausea and vomiting (PONV) within the first 24 hours, while only 28% of those receiving dexamethasone 8 mg reported PONV, a statistically significant difference ($P < 0.001$) compared to the placebo group, which had a PONV rate of 76%. Furthermore, patients receiving dexamethasone 8 mg reported less severe nausea than those in the placebo group ($P = 0.008$), whereas no significant difference was observed between the 4 mg dexamethasone and placebo groups ($P = 0.172$).Additionally, the need for indomethacin to manage intolerable pain was significantly lower in the dexamethasone 8 mg group compared to the placebo group ($P = 0.009$). This indicates that higher doses of dexamethasone not only reduced the incidence of PONV but also improved pain management outcomes. Importantly, there were no clinically significant adverse events linked to the administration of dexamethasone, including any extrapyramidal symptoms associated with traditional antiemetics like droperidol. Moreover, none of the patients reported any disruption to their normal daily activities due to the treatment. (14).

A dose-ranging RCT which was conducted by ho wang et al to evaluate the effectiveness of dexamethasone in preventing nausea and vomiting within the first 24 hours following epidural morphine administration in 225 women undergoing total abdominal hysterectomy. Participants were randomly assigned to receive either IV dexamethasone at doses of 10 mg, 5 mg, or 2.5 mg, IV droperidol 1.25 mg, or saline as a placebo, alongside a standard dose of epidural morphine for postoperative pain relief.

The results indicated that patients receiving dexamethasone at 5 mg or 10 mg, as well as those receiving droperidol, experienced significantly lower incidences of nausea and vomiting compared to the saline group. Key metrics included total nausea and vomiting rates, the occurrence of more than four vomiting episodes, and the need for rescue antiemetics, with statistical significance

ranging from $P < 0.05$ to $P < 0.01$. However, the differences between the higher dexamethasone doses and droperidol were not significant, and the 2.5 mg dose was found to be ineffective. The study concluded that 5 mg of dexamethasone is as effective as 10 mg, suggesting the smaller dose is preferable for preventing nausea and vomiting associated with epidural morphine (15).

3 Objective

3.1 General objective

To evaluate effectiveness of different dose of dexamethasone for prevention of postoperative nausea and vomiting

3.2 specific objective

1 to assess incidence of POVN in different dose group

2 to analyze different subgroup response

4 hypothesis

Hypothesis: In adult elective patients undergoing surgery at Tikur Anbessa Specialized Hospital in 2024/2025, a higher dose of dexamethasone (8 mg) will be superior to a lower dose (4 mg) in reducing the incidence of postoperative nausea and vomiting (PONV) within the first 24 hours after surgery.

Null Hypothesis (H0): There is no significant difference in the incidence of postoperative nausea and vomiting between the higher dose (8 mg) and the lower dose (4 mg) of dexamethasone in adult elective patients.

5 Methodology

5.1 Study setting and period

This study was conducted in the elective operating theaters of Tikur Anbessa Specialized Hospital (TASH), located in Addis Ababa, the capital city of Ethiopia. Geographically, Addis Ababa is situated at the heart of the country, at approximately 9°02′N latitude and 38°45′E longitude. TASH is one of the largest referral centers in Ethiopia and serves as a major teaching hospital, providing training for both undergraduate and postgraduate students in clinical and preclinical disciplines. The hospital is equipped with 13 elective and 4 emergency operating rooms, as well as three post-anesthesia care units (PACUs) comprising a total of nine recovery beds. On average, approximately 400 elective surgical procedures are performed each month, with about 55% classified as elective cases. https://aau.edu.et/pages/A-A-U-%20-S-e-r-v-i-c-s/%20%20detail?title=Tikur~Anbessa~Specialized~HospitalAnesthesia care is primarily delivered by anesthesiology residents under the supervision of consultant anesthesiologists. In addition, nurse anesthetists also provide care under appropriate supervision. The study conducted from October 2024 to March 2025.

5.2 Study design

It is institution based prospective randomized single blind placebo controlled trial assessing the efficacy of different dose of dexamethasone in prevention of PONV in surgical patients.

5.3 population

5.3.1 Source population

All adult patients scheduled to have elective surgery at TASH under general anesthesia

5.3.2 Study population

The study included all elective surgical patient who underwent surgery under GA during study period and who met inclusion criteria

5.4 Inclusion and exclusion criteria

5.4.1 Inclusion criteria

Adult patient>18years old undergoing elective surgery under GA.Scheduled for elective surgery under general anesthesia who are ASA 1 or 2

5.4.2 Exclusion criteria

History of previous nausea and vomiting, diabetes, Antiemetic use in previous 48 hour

Adverse reaction to steroid, known adrenal insufficiency, emergency surgery neurosurgery

5. 5 Sample size and sampling procedure

The sample size was calculated using Epi Info software. Based on a previous study, the placebo group that did not receive antiemetics had a 44% incidence of postoperative nausea and vomiting (PONV). To detect an absolute difference of 25% between groups, with a power of 80% and a two-sided alpha level of 0.05, approximately 55 participants were required in each group. Accounting for a 10% dropout rate, the total sample size was determined to be 110 patients.

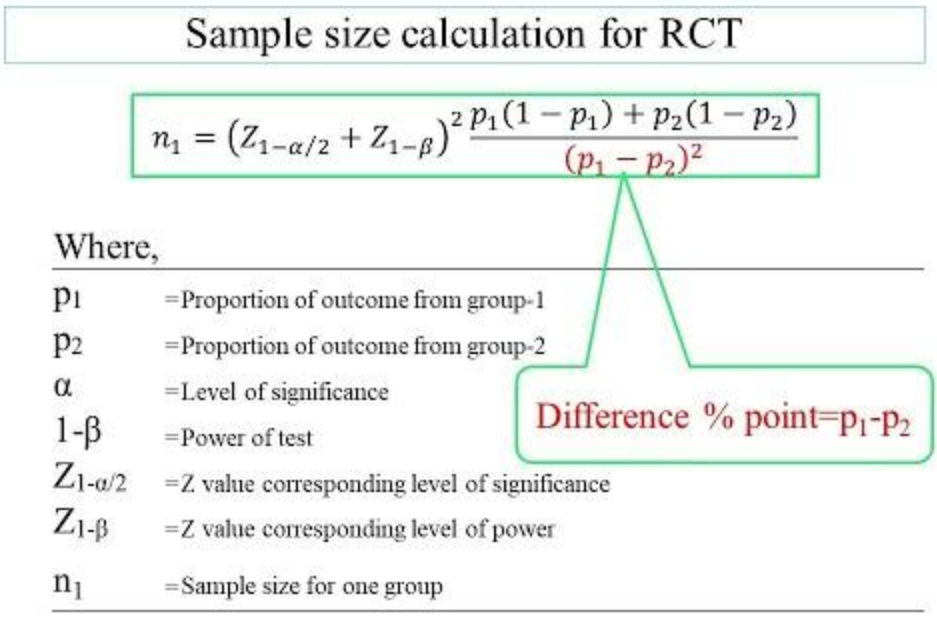
N1=55

P1=0.44

P2=0.19

Z1-A/2=1.96

Z1-B=0.84



N1-(1.96+0.84) (1.96+0.84) 0.44(1-0.44)+ 0.19(1-0.19)/(0.44-0.19)(0.44-0.19)

=7.84(0.2464+0.1539)/0.0625

=50

50 plus 10 % dropout=55

5.6 study variable

5.6.1 Dependent variable

postoperative nausea, vomiting

5.6.2 Independent variable

dose of dexamethasone

5.6.3 Control variable

age sex previous PONV type of surgery smoking status duration of anesthesia type of anesthesia

5.7 Data collection procedures

Eligible participants who gave consent were randomly assigned to one of two dexamethasone dosing groups (4 mg or 8 mg) using a pre prepared table. Dexamethasone was administered intravenously at the designated dose immediately after the induction of anesthesia.

Preoperative and intraoperative data were collected from the anesthesia records using pretested questionnaires prepared in English, through document review and patient observation by trained

nurses. Postoperative data was collected by trained nurses in the Post-Anesthesia Care Unit (PACU).Patients were evaluated, and data collected on the incidence of PONV, the severity of nausea (using a visual analog scale), and the need for rescue antiemetic's in both the recovery room and the surgical ward during the first 24 hours postoperatively. The following table was used for the dexamethasone administration.

GI TABLE 1st week Monday Wednesday Friday dexamethasone 4mg

Tuesday Thursday dexamethasone 8mg

2nd week Tuesday Thursday dexamethasone 4mg

Monday Wednesday Friday 8mg

Gynecology table 1st week Monday Wednesday Friday dexamethasone 8mg

Tuesday Thursday dexamethasone 4mg

2nd week Tuesday Thursday dexamethasone 8 mg

Monday Wednesday Friday dexamethasone 4mg

Chest table 1st week Monday Wednesday Friday dexamethasone 8mg

Tuesday Thursday dexamethasone 4mg

2nd week Tuesday Thursday dexamethasone 8 mg

Monday Wednesday Friday dexamethasone 4mg

Open urology 1st week Monday Wednesday Friday dexamethasone 4mg

Tuesday Thursday dexamethasone 8mg

2nd week Tuesday Thursday dexamethasone 4mg

Monday Wednesday Friday 8mg

5.8 operational definition

Nausea feeling of sickness or discomfort in the stomach that may come with urge to vomit within 24 hours post-surgery

Vomiting is expulsion of gastric content through mouth or nose within 24 hours post-surgery

Severity of nausea mild 1 to 3 moderate 4 to 6 and severe 7 to 10

5.9 data quality control and management

The data collectors were trained prior to the data collection process and met with the principal investigator on a daily basis to clarify any ambiguities. The quality of the data was checked for clarity, completeness, and consistency with the anesthesia sheet and patient chart. The principal investigator supervised the data collection on a daily basis.

5.10 Data Analysis Plan and Procedure

The **primary analysis** compared the prevalence of postoperative nausea and vomiting (PONV) between the different dexamethasone dose groups using the Chi-square test.

Subgroup analyses were conducted based on variables such as age, sex, and type of surgery to assess potential interactions or confounding effects.

Continuous variables were expressed as mean ± standard deviation, unless otherwise specified. Categorical data were analyzed using the Chi-square test, while continuous variables were analyzed using Student's *t*-test for normally distributed data. Two-tailed *p*-values < 0.05 were considered statistically significant.

All statistical analyses were performed using SPSS version 25 (SPSS Inc., Chicago, IL, USA).

5.11 ethical considerations

After ethical clearance was obtained from the Addis Ababa University School of Medicine, Department of Anesthesiology, Critical Care, and Pain Medicine, each participant provided verbal consent after being informed of the study's objectives and significance. An anonymous questionnaire was used throughout the entire investigation, and all responses were kept confidential and anonymous.

5.13 dissemination plan

The study results will be submitted to the Department of Anesthesiology, Critical Care, and Pain Medicine. Efforts will also be made to publish the findings in international peer-reviewed journals.

6. Result

6.1 Sociodemographic characteristic of the study participants

Majority of the study participants in were in the age group of 31-45 years with the mean and SD age of 47.65 +_16.09 years respectively. Fifty-two percent of the study participants were female

Table 7. *The Sociodemographic characteristics of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)*

Variable	Frequency	Percent
Age in years		
18-30	17	15.5
31-40	22	20.0
41-50	24	21.8
51-60	18	16.4
>60	29	26.4
Sex		
Female	57	51.8
Male	53	48.2
BMI		
18.5-24.9	63	57.3
≥25	47	42.7
ASA classification		
ASA I	61	55.5
ASA II	49	44.5

6.2 Anesthesia related characteristics of the study participants

Sixty five point five percent of patients were administered ≤2000ml of fluids. Half of the surgery duration was 2-3 hours. Fifty-one percent of the anesthesia duration were >3hours and 91.8% of patients took morphine for intraoperative analgesia.

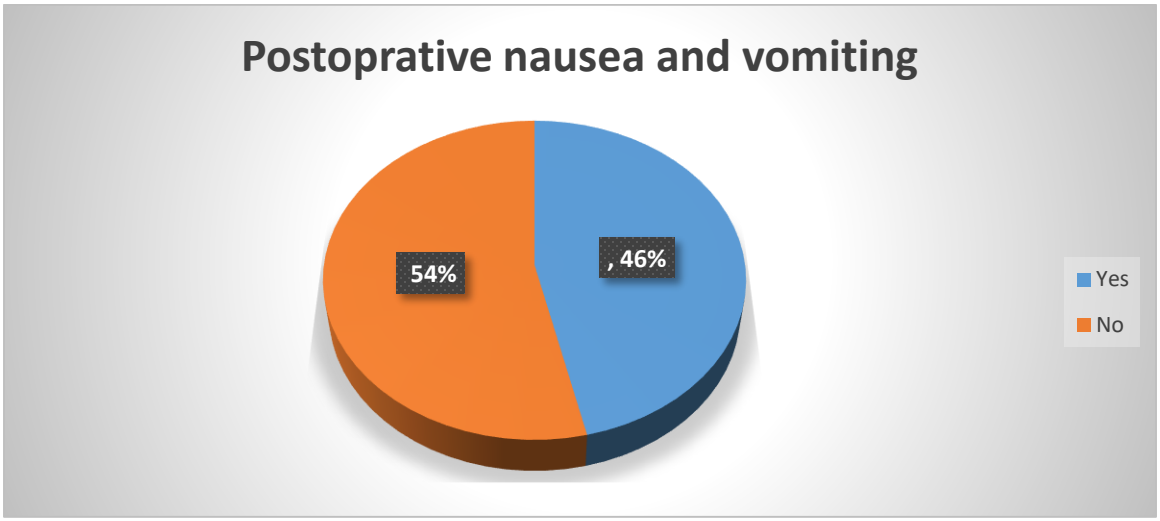
Table 8. *Anesthesia related characteristics of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)*

Variable	Frequency	Percent
Types of anesthesia		
GA with ETT	110	100
Induction		
Ketamine	1	0.9
Propofol	109	99.1
Type of maintenance		
Inhalational	108	98.2
TIVA	2	1.8
Fluid administered in ml		
≤2000	72	65.5
>2000	38	34.5
Duration of surgery in hours		
<2	27	24.5
2-3	54	49.1
>3	29	26.4
Duration of anesthesia in hours		
<2	11	10
2-3	43	39.1
>3	56	50.9
Types of surgery		
Cardiothoracic	11	10.0
Colorectal	16	14.5
Endocrine	6	5.5

Gynecology	16	14.5
Hepatobiliary	18	16.4
Orthopedics	16	14.5
Urology	22	20.0
Vascular	5	4.5
Intraoperative opioid		
Fentanyl	9	8.2
Morphine	101	91.8

6.4 Incidence of postoperative nausea and vomiting

Figure 1. The incidence of postoperative nausea and vomiting among elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)



6.5 The characteristics of nausea and vomiting of the study participants

Forty five point five percent, 40.9% and 13.6% of the participants had nausea at 0-6hours, 6-12hours and 12-24ours respectively. On the other hand, 25.5%, 4.5% and 1.8% of the participants had vomiting at 0-6hrs, 6-12hours and 12.24 hours respectively.

Table 9. *The characteristics of nausea and vomiting of the elective surgical patients who had surgery at TASH from December 2024 to march 15 2025(n=110)*

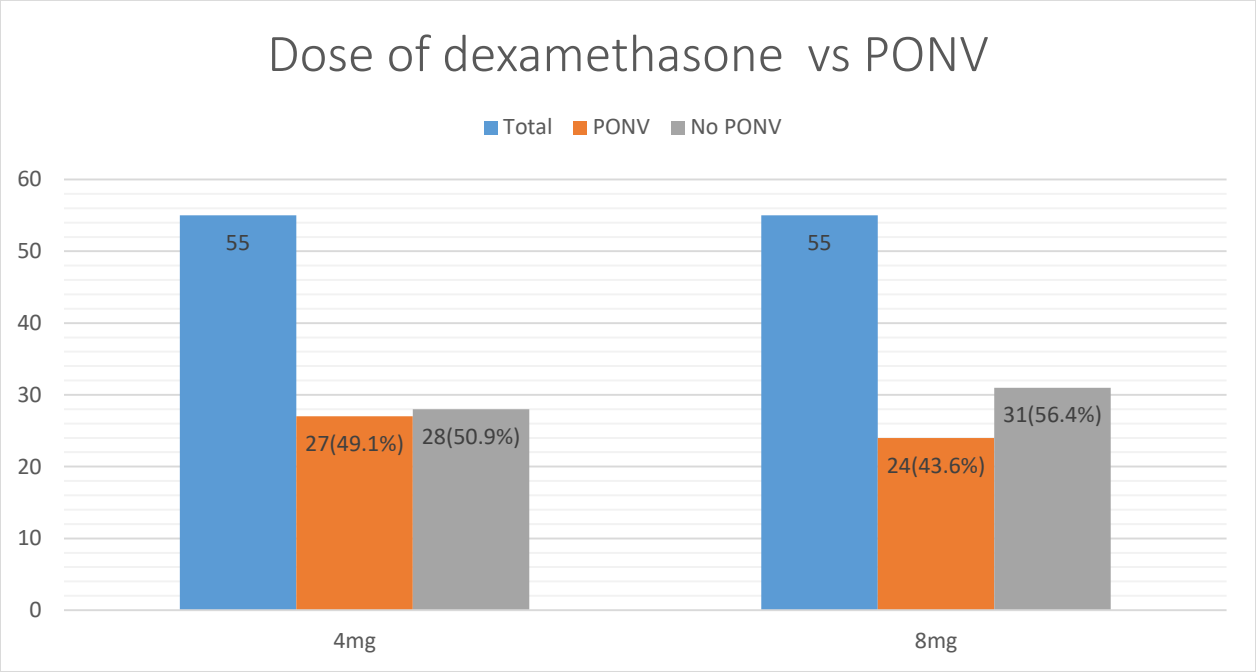
Variable	Category	Response	frequency	Percent
Nausea	0-6hrs	Yes	50	45.5
		No	60	54.5

	Severity	Mild	32	64
		Moderate	15	30
		Severe	3	6
	6-12hrs	Yes	45	40.9
		No	65	59.1
	Severity	Mild	44	97.8
		Moderate	1	2.2
	12-24hrs	Yes	15	13.6
		No	95	86.4
	Severity	Mild	14	94.1
		Moderate	1	5.9
Vomiting	0-6hrs	Yes	28	25.5
		no	82	74.5
	Episodes of vomiting	1	15	53.6
		2	11	39.3
		3 and above	2	7.2
	6-12hrs	Yes	5	4.5
		no	105	95.5
	12-24hrs	Yes	2	1.8
		no	108	98.2

6.6 The incidence of nausea and vomiting with dose of dexamethasone

The figure below found that the incidence of PONV in 4mg dexamethasone was 49.1% and in 8mg of dexamethasone was 43.6%. The difference in PONV rate between the two doses were not statistically significant difference (p=0.324)

Table 10. The incidence of nausea and vomiting with dose of dexamethasone of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)



6.7 PONV vs dexamethasone dose

The overall incidence of nausea in 4mg dexamethasone were 49.1% and in 8mg were 43.6%. The overall incidence of vomiting in 4mg were 29.1% and in 8mg were 23.6% as shown in the table below.

Table 11. PONV vs dexamethasone dose of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)

Variable	category	Response	Dose of dexamethasone	
			4mg	8mg
Nausea	0-6hrs	Yes	27(49.1%)	23(41.8%)
		No	28(50.9%)	32(58.2%)
	6-12hr	Yes	27(49.1%)	18(32.7%)

		No	28(50.9%)	37(67.3%)
	12-24hrs	Yes	7(12.7%)	8(14.5%)
		No	48(87.3%)	47(85.5%)
	Overall incidence	Yes	27(49.1%)	24(43.6%)
		No	28(50.9%)	31(56.4%)
vomiting	0-6hrs	Yes	15(27.3%)	13(23.6%)
		No	40(72.7%)	42(76.4%)
	6-12hr	Yes	4(7.3%)	1(1.8%)
		No	51(92.7%)	54(98.2%)
	12-24hrs	Yes	1(1.8%)	1(1.8%)
		No	54(98.2%)	54(98.2%)
	Overall incidence	Yes	16(29.1%)	13(23.6%)
		No	39(70.9%)	42(76.2%)

6.8 The correlation between PONV dexamethasone dose and demographic characteristics

The incidence of PONV at age 18-30 years were 14.8% in 4mg dose of dexamethasone, while the incidence was drop to 4.2% with the same age group with 8mg dexamethasone. But at the age of >60 the incidence of PONV were 22.2% at 4mg dexamethasone and it was up to 37.5% with 8mg dexamethasone. This discrepancy was not statistically significant.

Table 12. *The correlation between PONV dexamethasone dose and demographic characteristics of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)*

variable	Dose dexamethasone	category	PONV		p-value
			Yes (%)	No (%)	
Age	4mg	18-30	4	4	0.624
		31-40	7	3	
		41-50	4	9	

		51-60	6	4	
		>60	6	8	
	8mg	18-30	1	8	0.129
		31-40	4	8	
		41-50	7	4	
		51-60	3	5	
		>60	9	6	
Sex	4mg	Female	16(59.3)	12(42.9)	0.224
		Male	11(40.7)	16(57.1)	
	8mg	Female	13(54.2)	16(51.6)	
		Male	11(45.8)	15(48.4)	
BMI	4mg	18.5-24.9	17(63)	15(53.6)	0.851
		>25	10(37)	13(46.4)	
	8mg	18.5-24.9	15(62.5)	16(51.6)	
		>25	9(37.5)	15(48.4)	
ASA class	4mg	ASA I	16(59.3)	14(50)	0.434
		ASAII	11(40.7)	14(50)	
	8mg	ASAI	13(54.2)	18(58.1)	
		ASA II	11(45.8)	13(41.9)	
Fluid administered	4mg	<=2000	18(66.7)	19(67.9)	0.491
		>2000	9(33.3)	9(32.1)	
	8mg	<=2000	10(41.7)	25(80.6)	
		>2000	14(58.3)	6(19.4)	
Duration of surgery in hrs	4mg	<2	6(22.2)	7(25)	
		2-3	13(48.1)	16(57.1)	0.375
		>3	8(29.6)	5(17.9)	
	8mg	<2	2(8.3)	12(38.7)	
		2-3	9(37.5)	16(51.6)	
		>3	13(54.2)	3(9.7)	

6.9 The determinant factors of postoperative nausea and vomiting

The odds of having duration of surgery >3hours were 4.6 times increase its PONV compared to those of duration of surgery <2hrs (AOR=4.6, 95%CI=1.76, 28.15

Table 13. The bivariate and multivariate association between independent variable and PONV of the elective surgical patients who had surgery at TASH from December 2024 to March 15 2025(n=110)

variable	PONV		P-value	COR with 95%CI	P-value	AOR with95%CI
	yes	no				
Age in years						
18-30	5	12	1		1	
31-40	11	11	0.173	1.1(0.56, 1.97)	0.859	1.1(0.38, 3.20)
41-50	11	13	0.549	0.79(0.36, 1.73)	0.319	0.53(0.15, 1.86)
51-60	9	9	0.652	0.8(.23,1.7)	0.581	0.87(0.115,3)
>61	15	14	0.149	1.1(0.52, 2.22)	0966	0.98(0.31, 3.06)
Fluid administration						
≤2000	28	44	1		1	
>2000	23	15	0.198	1.5(0.80, 2.94)	0.327	1.6(0.62, 4.18)
Duration of surgery in hours						
<2	8	19	1		1	
2-3	22	32	0.176	0.67(0.40, 1.18)	0.887	1.1(0.29, 4.17)
>3	21	8	0.020	2.6(1.16, 5.93)	0.046	4.6(1.76, 28.15)
Duration of anesthesia in hours						
<2	2	9	1		1	
2-3	17	26	0.173	0.65(0.36, 1.21)	0683	0.77(0.22, 2.68)
>3	32	24	0.287	1.3(0.79, 1.21)	0.757	0.76(0.14, 4.17)
Dose of dexamethasone in mg						
4	27	28	1		1	
8	24	31	0.147	0.77(0.45, 1.32)	0.116	0.54(0.25, 1.16)

7. Discussion

This study evaluated the effectiveness of two dexamethasone doses 4mg and 8mg for the prevention of PONV in adult elective surgical patients. Overall incidence in 4 mg of dexamethasone was 49.1%, while it was 43.6% in those who received 8 mg. although the incidence is lower in high dose group the difference was not statistically significant(p value 0.324),suggesting that both doses have similar efficacy in preventing PONV in the studied

population. These findings are consistent with previous RCTS and systematic reviews that were done by de oliviera et al (8). Which concluded that there is no significant dose response benefit between 4mg and 8mg dexamethasone in PONV prevention.

However, studies like that of fujii et al. showed a significant reduction in PONV with the 8 mg dose (28%) compared to the 4 mg dose(64%), highlighting that the response to dexamethasone may vary across populations possibly due to genetics , demographic or surgical factors. The higher incidence of PONV in the 8 mg dexamethasone group in our study, compared to Fujii's, can be partly attributed to the universal use of morphine in our patient population. Additional contributing factors include a higher proportion of female and younger patients in our study. Fujii et al.'s study was conducted on patients undergoing thyroidectomy under general anesthesia, with a sample size of 75, including 55 females. The smaller sample size, limited surgical procedure (only thyroidectomy), and a lower male-to-female ratio reduce the generalizability and reliability of their findings when compared to our broader study.

One of the significant findings in our multivariable analysis was that a surgery duration exceeding 3 hours was significantly associated with a higher risk of PONV (Adjusted Odds Ratio = 4.6, p = 0.046). This aligns with established literature that prolonged surgery and anesthesia increase the risk of PONV due to prolonged exposure to emetogenic stimuli such as opioids, inhalational agents, and surgical manipulation.the clinical implication being high risk patients (eg those undergoing prolonged surgeries)may benefit from augmented prophylaxis(eg multidrug regiemens or higher dexamethasone doses).

Other variables such as age, sex, BMI, ASA classification, and intraoperative fluid volume were not significantly associated with PONV in this study. This could be due to sample size limitations or effective randomization that balanced these factors across the groups.

Overall, the results of this study suggest that 4 mg dexamethasone may be sufficient for routine PONV prophylaxis in many surgical patients, without the need for a higher 8 mg dose, thus minimizing unnecessary corticosteroid exposure.

8 strength and limitation

Strength

The strengths of this study include its prospective design, which enables real-time data collection and reduces recall bias, thereby enhancing data reliability. Randomization of participants minimizes selection bias and ensures comparable baseline characteristics between groups, improving internal validity. The single-blind design reduces performance and reporting bias, especially when evaluating subjective outcomes like nausea severity. The study also holds direct clinical relevance, as it investigates the efficacy of a widely used medication—dexamethasone—in a practical, real-world setting, providing valuable evidence for guiding perioperative care and antiemetic use. Additionally, the implementation of a standardized anesthesia and postoperative care protocol reduces variability in patient management and strengthens the consistency and comparability of the results.

Limitation

This study has several limitations. Being a single-center study conducted at Tikur Anbessa Specialized Hospital, the findings may not be generalizable to other healthcare settings or populations. The short follow-up duration of only 24 hours may have missed delayed episodes of postoperative nausea and vomiting (PONV). Additionally, the single-blind design, without blinding of care providers, could introduce observer bias during outcome assessment. Finally, resource constraints typical of the setting, such as limited monitoring tools or staffing shortages, may have affected data accuracy and the consistency of interventions.

9. Conclusion

Our Finding suggests that increasing the dose from 4 mg to 8 mg does not confer additional benefit in reducing PONV within the first 24 hours postoperatively. However, surgical duration longer than three hours was found to be significantly associated with a higher risk of PONV, highlighting the importance of considering procedural factors when planning antiemetic prophylaxis. Given the comparable effectiveness of both doses, the use of 4 mg dexamethasone may be sufficient in routine clinical practice, helping to minimize corticosteroid exposure while maintaining antiemetic efficacy.

10. Recommendations

• A 4 mg dose of dexamethasone should be considered sufficient for routine PONV prophylaxis in elective surgical patients under general anesthesia. Higher doses (8 mg) may be reserved for high-risk patients or procedures with longer durations, pending further evidence.

• Institutions may adopt a standardized dosing protocol to reduce variability in antiemetic practice and optimize resource use.

• Larger, multicenter studies are recommended to confirm these findings and explore optimal dosing strategies in different patient populations and surgical contexts.

• Future studies should also assess longer-term outcomes and potential adverse effects associated with higher dexamethasone doses.

• Incorporating validated PONV risk scores (e.g., Apfel score) into perioperative assessments could help tailor prophylaxis more precisely to individual risk profiles.

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7. 2.2 Incidence

8. 2.3 dose of Dexamethasone

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16 2.3 dose of Dexamethasone

Annex

9.1. Annex 1: Information sheet

Addis Ababa University, School of Medicine, from specialty program. A Addis Ababa University a questionnaire for studying prospective randomized single blind study of efficacy of dexamethasone dose for postoperative nausea and vomiting at at Tikur Anbessa Specialized Hospital.

Good morning/good afternoon. My name is ----------; I come from Addis Ababa University. I am working with an investigator, Dr Amanuel Naba, doing his thesis for the partial fulfillment of a speciality certificate in Anesthesiology, critical care and pain medicine. I am collecting data for **a prospective randomized single blind study of efficacy of dexamethasone dose for postoperative nausea and vomiting at** I am going to ask you some questions that are not difficult to answer. Your name will not be written in this format and never be used in connection with any of the information you are going to tell me. You are not obliged to answer any question that you do not want to answer and you may end this interview at any time you want to. However, your honest answers to these questions will help us to determine effectiveness of dexamethasone dose for postoperative nausea vomiting.I would like to appreciate your help in responding to these questions, and the interview will not take more than 10 minutes.

Name: Dr. Amanuel Naba

Tel- +251-916389033/+251-0913560364

Email- amanuelnaba@gmail.com

Annex 2: Informed consent

I am the individual asked to be a study participant. Based on the information provided by the principal investigator, I understand that it is not necessary to write my name, the information I tell her/him will not be used for other purposes and the information obtained from me will help to identify effective of dexamethasone dose for postoperative nausea and vomiting and improve future postoperative management

So I agree to be a study participant.

1. Yes……. 2. No……

If yes go to the next section. If no go to the next participant

Questioner code ----------

Name of data collector ----------

Signature----------

Questionnaire

Table 7 questionnaire

Sociodemographic data

No	**factor**	**Response**	
1	**age**		
2	**sex**	**Male** **female**	
3	**height**		

4	**weight**		
5	**BMI**		
6	**ASA**	**1** **2**	

Anesthesia management

no	**Factor**	**Response**	
1	**Type of anesthesia**	**GA with LMA** **GA with ETT**	
2	**INDUCTION**	**PROPOFOL** **KETAMINE** **FENTANYL** **MIDAZOLAM**	
3	**Maintenance anesthesia**	**Inhalational** **TIVA**	
4	**FLUID ADMINISTERED**		
5	**Estimated BLEEDING**		

6	**Duration of surgery in minute**		
7	**Type of surgery**		
8	**Intraoperative opioid used**		
9	**Duration of anesthesia**		

Dexamethasone administered

no	**Factor**	**Response**	
1	**Dexamethasone administered**	**Yes** **no**	
2	**Dose**	**A 4mg** **B 8mg**	

Postoperative experience

no	**Factor**	**response**		
	Prevalence of nausea		**At 0 hour** **6 hour** **12 hour** **24 hour**	
	vomiting	**Yes** **No**	**At 0 hour** **6hour**	

			12 hour **24 hour**	
	If yes any antiemetic used		**At 0 hour** **6 hour** **12 hour** **24 hour**	