



Cross-sectional Study

Assessment of post-operative nausea and vomiting prophylaxis usage for cesarean section, 2021: A cross sectional study



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ABSTRACT

Background: Post-operative nausea and vomiting (PONV) are common and distressing to patients. This common anesthetic and surgical side effect has been reported to increase patient dissatisfaction and can be more distressing to patients than post-operative pain. It has multi-factorial causes: patient, anesthesia and surgery related risk factors have been identified. Prevention of PONV is important since it has psychological and physical effects, and it can also cause severe complications.

Objective: To determine the level of practice of PONV prophylaxis usage for caesarean section.

Methods: This clinical perspective study was conducted at all pregnant mothers scheduled for caesarean section under anesthesia from March 1 to March 30, 2021 consecutively. The standards were directly changed into question forms with two integral checking components, "Yes", and "No". Data were entered and analyzed by statistical package of social sciences (SPSS) version 20.

Results: A total of 100 parturients scheduled for caesarean section were included with a response rate of 100%. Based on the standards, Anti-emetic treatment to patients with post-operative nausea and vomiting (PONV), adherence of anesthetists to local evidence based guideline for PONV prevention and more importantly no prophylactic administration to patients at low risk for PONV were implemented with a percentage of 17%, 47%, and 14% respectively.

Conclusions: and recommendations: There was a significant performance gap in the clinical practice of prevention of post-operative nausea and vomiting. We strongly suggest that adherence to a Protocol to reduce baseline risk and the adoption of a multimodal approach will highly likely ensure success in the management of PONV. The usage of appropriate anti-emetic prophylaxis to the right patient is necessary to have a good outcome after surgery and anesthesia.

1. Background

Caesarean section under spinal anesthesia has become increasingly popular and it is most commonly performed surgical procedure. Regional anesthesia is used in 80% of cesarean delivery where as 20% receive general anesthesia [1,2]. Despite consciousness allows the patient to have an early intimate bond with the newborn, the procedure may be associated with complications [3]. Arterial hypotension, post dural puncture headache, insufficient anesthesia, back pain and psychological distress are some of the adverse effects of regional anesthesia

for caesarean section [4].

Despite modern anesthetic and surgical techniques, the incidence of post-operative nausea and vomiting (PONV) remains high [5,6]. The incidence of vomiting is about 30%, the incidence of nausea is about 50%, and in a subset of high-risk patients, the PONV rate can be as high as 80% [7,8]. A frequent problem after caesarean section is nausea and vomiting under regional anesthesia [9,10]. In our hospital, the incidence of intra-operative nausea and vomiting of parturients under spinal anesthesia was 18.5% [11].

The predominant risk factor for nausea and vomiting after spinal

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anesthesia in cesarean section is arterial hypotension due to the blockade of the sympathetic nerve system [12]. PONV could be affected by hormonal and physiological changes of pregnancy, which alter the gastro-esophageal sphincter tone and the activity of the small bowel and esophagus, uterotonic agents, intra-operative manipulation of the uterus, and psychological distress aggravated by insufficient anesthesia [13,14].

Critical anesthetic events such as airway obstruction, aspiration pneumonia, esophageal rupture, electrolyte imbalance, and wound dehiscence are rare, but mainly related to post-operative nausea and vomiting in general surgical patients [15]. Unresolved PONV may result in prolonged post anesthesia care unit (PACU) stay and unanticipated hospital admission that result in a significant increase in overall health care costs [16,17]. This common anesthetic and surgical side effect has been reported to increase patient dissatisfaction and can be more distressing to patients than postoperative pain [18,19].

Post-operative nausea and vomiting has multi factorial causes; patient, anesthesia and surgery related risk factors have been identified. Young age, female sex, history of PONV, non-smoking history and a history of severe motion sickness are patient related factors [8,20].

Prevention of PONV is important since it has psychological and physical effects. Anti-emetic prophylaxis decreases the incidence of PONV and thus patient-related distress and reduce health care costs [16, 21].

Like all drugs, anti-emetics carry some risk for adverse effects, which range in severity from mild headache to possibly more meaningful QTc prolongations that may rarely be associated with cardiac arrest [22]. Therefore, a patient's baseline risk for PONV should be objectively assessed using a validated risk score that is based on independent predictors, so the number and choice of prophylactic anti-emetics can be titrated against the patient's risk. Even though there is strong evidence for a couple of truly independent risk factors for PONV, none of these risk factors taken alone as a single predictor is clinically sufficient for a risk assessment or to make clinical decisions about the need for prophylactic anti-emetics [23].

The two most commonly used risk scores for adult patients undergoing surgery under anesthesia are the Koivuranta score and the Apfel score [7,24]. The Apfel simplified risk score is based on 4 predictors: female sex, history of PONV and/or motion sickness, non-smoking status, and use of post-operative opioids. The incidence of PONV with the presence of 0, 1, 2, 3, and 4 risk factors was 10%, 20%, 40%, 60%, and 80% respectively. The panel considers patients with 0–1, 2 and 3 or more risk factor as low, medium, and high risk categories respectively [7].

Post-operative nausea and vomiting (PONV) are still common after surgery and anesthesia. This is not only distressing to the patient, but also increases unnecessary costs of healthcare. Therefore, a thorough understanding of the mechanism of nausea and vomiting and a careful identification and stratification of risk factors provide a rationale for appropriate management of PONV. Protocol to reduce baseline risk and the adoption of a multimodal approach will highly likely ensure success in the management of PONV [18].

The aim of this study was to determine the level of practice of post-operative nausea and vomiting prophylaxis usage for parturients scheduled for caesarean section at a comprehensive specialized referral hospital in Ethiopia.

2. Standards for PONV prevention

Society for ambulatory anesthesiology (SAMBA) developed a worldwide consensus guideline for the prevention and management of postoperative nausea and vomiting in 2014. The guideline contains eight strong recommendations on the prophylaxis and treatment of PONV through appropriate identification, scoring and stratification of independent risk factors for all surgical patients (Table 1) [23].

Table 1
Standards for post-operative nausea and vomiting (PONV) prevention.

SN.	Standards	Target (%)	Evidence	Data source
1.	Patient's risk for post-operative nausea and vomiting should be stratified	100	SAMBA	Chart
2.	The base line risk reduction strategies for patient's nausea and vomiting should be taken	100	SAMBA	Chart
3.	No anti-emetic prophylaxis is administered to a patient who is at low risk for PONV	100	SAMBA	Chart
4.	The anti-emetic prophylaxis should be administered using 1–2 agents to a patient at medium risk for PONV	100	SAMBA	Chart
5.	The anti-emetic prophylaxis should be administered using ≥ 2 (multimodal) agents to a patient at high risk for PONV	100	SAMBA	Chart
6.	The anti-emetic agent should be provided to patients with PONV who did not receive prophylaxis or in whom prophylaxis is failed	100	SAMBA	Interview & chart
7.	A clinician should be adhered to the local evidence based guideline for PONV prevention	100	SAMBA	Interview

SAMBA: Society for ambulatory anesthesiology, PONV: Postoperative nausea and vomiting.

3. Methods

3.1. Study design and setting

This institution-based cross sectional study was conducted on 100 parturients scheduled for caesarean section at a comprehensive, specialized referral hospital in Ethiopia from March 1, 2021 to March 30, 2021. Parturients scheduled for caesarean delivery under anesthesia during the study period were participants of the study. This paper was registered in a research registry with the unique identifying number (UIN) of 7469 and guided by STROCSS 2021 checklist [25].

3.2. Sample size

A total of 100 parturients scheduled for caesarean section under anesthesia were the sample of the study.

3.3. Data collection procedure

A consecutive sampling method was used. Data was collected through direct history taking from the patient, reviewing the chart and by asking the responsible anaesthetist using standardized checklists. The standards were directly changed into question forms with two integral checking components of Yes, No or Not applicable.

3.4. Data analysis method

The data were entered and analyzed by SPSS version 20. The descriptive data were presented by frequency and percentage.

3.5. Instrument for post-operative nausea and vomiting prevention

The following questionnaire form was used as a tool for data collection of post-operative nausea and vomiting prevention (Table 2).

3.6. Ethical consideration

Appropriate and informed verbal and written consent from patients to participate was taken. Ethical approval from the research ethical

Table 2
Tool for PONV prevention.

SN	Questionnaire	Response		
		Yes	No	NA
1	Risk of the patient for PONV was stratified			
2	The base line risk reduction strategies for patient's PONV was taken			
3	No prophylaxis administered to a patient who is at low risk for PONV			
4	Prophylaxis administered using 1–2 agents to patients at medium risk for PONV			
5	Prophylaxis administered using ≥2 agents to patients at high risk for PONV			
6	Anti-emetic treatment provided to patients with PONV who did not receive prophylaxis or in whom prophylaxis is failed			
7	Adherence of anaesthetist to the local guideline for prevention of PONV			

NA: Not applicable, PONV: Postoperative nausea and vomiting.

review committee of the institution was obtained.

4. Results

The mean age of parturient was 28 years. Only 4 (4%) of study participants had smoking history whereas 23% of patients had history of motion sickness (Table 3).

None of the parturient had received opioids as intra-operative or pre-emptive analgesia. About 99 (99%) of caesarean section were performed under spinal anesthesia while only 1 (1%) parturient was operated under general anesthesia.

According to the guidelines risk stratification, 21%, 33% and 25% of patients were at low, medium and high risk of developing postoperative nausea and vomiting after caesarean section respectively. The overall practice of postoperative nausea and vomiting prevention or management, according to the standard was 56.5% (Fig. 1 & Table 4).

Risk stratification for PONV, base line risk reduction strategy for PONV, prophylaxis administration to medium risk patients for PONV, and prophylaxis administration to high risk patients for PONV were implemented with a percentage of 68%, 81%, 82%, and 76% respectively (Fig. 1 & Table 4).

Anti-emetic treatment to patients with PONV, adherence of anesthetists to local evidence based guideline for PONV prevention and more importantly, no prophylactic administration to patients at low risk for PONV were implemented with a percentage of 17%, 47%, and 14% respectively (Table 4).

5. Discussion

The Prevalence of postoperative nausea and vomiting prevention or

Table 3
Socio demographic characteristics of patients from March 1 to March 30, 2021, (N = 100).

Characteristics	Frequency(n)	Percentage (%)
Sex		
Male	53	53%
Female	47	47%
Age (years)		
0–14	12	12%
15–64	74	74%
65&above	14	14%
History of smoking		
Yes	4	4%
No	96	96%
History of motion sickness		
Yes	23	23%
No	77	77%

management, according to the standard was 56.5%. This showed that a significant number of patients had not received appropriate care for the prevention and management of nausea and vomiting after cesarean delivery under anesthesia.

A study conducted in this hospital showed that the prevalence of post-operative nausea and vomiting was 36.2% within 24 h after operation [26]. This could be explained by the current study result in which many patients did not receive the standard level of care for nausea and vomiting prophylaxis administration or treatment after cesarean section.

In this study, the practice of risk stratification, base line risk reduction strategy for PONV and prophylaxis administration to patients at medium and high risk for PONV was promising, however, still needs improvement.

The Performance level of preoperative risk stratification and quantification of patients for the probability of developing post-operative nausea or vomiting was 68%. The Lower incidence of nausea and vomiting after the operation can be attributed to adherence to the pre-operative risk stratification and use of appropriate prophylactic anti emetic agents [27]. Therefore, many patients in our hospital could be at risk of developing nausea and vomiting after cesarean delivery.

In this study, a large proportion of patients (81%) had got appropriate baseline risk reduction strategies for PONV. Minimizing baseline risk factors can significantly decrease the incidence of nausea and vomiting after the operation. Strategies recommended to reduce baseline risk include: The avoidance of general anesthesia by the use of regional anesthesia; Preferential use of propofol infusions; avoidance of nitrous oxide; avoidance of volatile anesthetics; minimization of peri-operative opioids; and adequate hydration [23].

Practice of multi modal approach of the prophylaxis administration to patients at high risk of PONV was 76%. Despite the high proportion of patients who are at high risk of PONV had received multiple antiemetic medications, still significant number of patients are at risk of PONV. Multi modal prophylactic therapy reduces incidence of post-operative nausea and vomiting [28].

On the other hand, anti-emetic treatment to patients with PONV, adherence of anesthetists to local evidence based guideline for PONV prevention and more importantly, no prophylactic administration to patients at low risk for PONV are implemented below 50% of the target and needs prompt intervention and improvement.

In this study, adherence of anesthetists to local protocol for PONV prevention was 47%. Adherence to a standard PONV prophylaxis protocol can limit the use of anti-emetic prophylaxis as 14% of our patients who are at risk of PONV did not receive any prophylactic agents pre-operatively. This strategy may therefore have economic implications for the patients and the care providers [27].

A cohort study in the UK, showed that adherence to the local guideline was persistently low which is in line with our study finding. Only 37% of medium and high risk patients received the specified prophylaxis which is lower as compared to our study result [29].

The management of PONV and its prevention is a challenge which should involve all members of the multidisciplinary team. New strategies are required in order to improve the quality of care patients received [30].

6. Conclusion and recommendations

Despite, the large case load and availability of local evidence based protocol for the prevention of post-operative nausea and vomiting, there was a significant performance gap in the clinical practice of prevention of post-operative nausea and vomiting. There were a significant performance gap in the clinical practice of prevention of post-operative nausea and vomiting.

We strongly suggest that adherence to a protocol to reduce baseline risk and the adoption of a multimodal approach will highly likely ensure success in the management of PONV. The usage of appropriate anti-

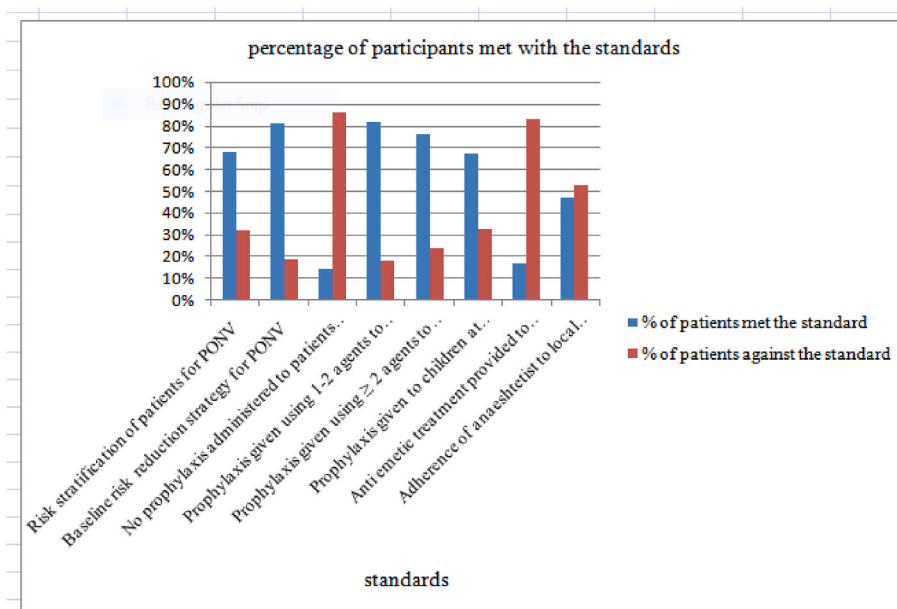


Fig. 1. Percentage of parturients get the standard care from March 1 to March 30, 2021, (N = 100).

Table 4

Frequency distribution of interviewed and observed participants based of the standards of PONV prevention from March 1 to March 30, 2021, (N = 100).

Standards	No. of patients as per category	N (%) of patients care received as per the standard
Risk of the patient for PONV was stratified	100	68 (68%)
Base line risk reduction strategies for patient's PONV was taken	100	81 (81%)
No prophylaxis administered to a patient who is at low risk for PONV	21	3 (14%)
Prophylaxis administered using 1-2 agents to patients at medium risk for PONV	33	27 (82%)
Prophylaxis administered using ≥2 agents (multi modal) to patients at high risk for PONV	25	19 (76%)
Anti-emetic treatment provided to patients with PONV who did not receive prophylaxis or in whom prophylaxis is failed	6	1 (17%)
Adherence of anaesthetist to the local guideline for prevention of PONV	100	47 (47%)

PONV: Postoperative nausea and vomiting.

emetic prophylaxis to the right patient is necessary to have a good outcome after surgery and anesthesia.

7. Strength and limitation of the study

This study had determined practice level of post-operative nausea and vomiting prevention and management after operation in comparison with standards. However, this research was conducted on small sample size and didn't show the relationship of factors with the practice of PONV prevention and management.

Availability of data and materials

The data sets used and analyzed during the study are available from the corresponding author on reasonable request.

Ethical approval

The study was approved by the ethical committee of the institution.

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Author contributions

B.A. Admass: conception and design of the study, acquisition of the data, analysis and interpretation of data, drafting of the manuscript and approval of the final version of the manuscript. H.Y. Tawye, N.S. Endale, D.Y. Melesse, M.M. Workie, Y.A. Ferede, M. Gashaw and A.T. Mersha were participated in data acquisition, revising of the manuscript critically for important intellectual content and approval of the final version of the manuscript.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

There is no conflict of interest among the participants of the article.

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