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Overview of Nausea and Vomiting in Postoperative Patients (PONV) in the Recovery Room

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ABSTRACT

Surgery requires anesthesia to reduce pain. Anesthesia can have side effects such as decreased blood pressure, pulse, nausea, and vomiting. The incidence of postoperative nausea and vomiting (PONV) is different for each person because it is influenced by several factors such as age, gender, BMI, physical status of the patient, previous history of PONV, history of motion sickness, type of action and anesthesia, and duration of surgery. The purpose of this study was to determine the factors that influence the incidence of nausea and vomiting in postoperative patients. This study used a descriptive analytical survey research design with a cross-sectional approach. This research was conducted in Recovery Room of Central Surgical Installation (IBS) of Tidar Hospital, Magelang City. The population in this study were 55 respondents. Sample in this study were 48 respondents who met the inclusion and exclusion criteria. Data analysis in this study used univariate analysis with frequency and percentage and bivariate analysis with chi square test. The results showed that the incidence of postoperative nausea and vomiting occurred 8 respondents (16.7%) in the mild category and 2 respondents (4.2%) in the moderate category. Factors that are proven to affect the incidence of nausea and vomiting in this study are the duration of surgery with a p-value of 0.001, the type of action performed with a - value of 0.015, and a history of illness with a p-value of 0.019.

Introduction

Surgery is one of the invasive actions that aims to overcome the disease suffered by the patient. Surgery can be used to diagnose, treat, or prevent further disease (Cing et al., 2022). Data from the Ministry of Health, 2021 states that 11% of the types of diseases in the world come from diseases that are treated with surgery or surgery (Kemenkes, 2021). According to the World Health Organization (WHO), every year patients who get surgery experience a significant increase. The number of surgeries performed in hospitals around the world in 2017 was recorded at 140 million patients in all hospitals in the world and increased by 8 million in 2019 to 148 million surgery cases. Surgery in Indonesia alone reached 1.2 million people in the same year (Krismanto & Jenie, 2021).

Surgery certainly requires an anesthesia procedure to reduce the pain felt by the patient during surgery. Anesthesia also functions so that the operation runs smoothly without causing side effects of the surgery provided. Based on its type, anesthesia is divided into two techniques, namely General Anesthesia (GA) and Regional Anesthesia (RA). General Anesthesia reduces or even eliminates pain throughout the body. Although anesthesia has been given to relieve pain and maintain the patient's vital functions, surgery still has side effects. Side effects that can occur are incision marks accompanied by pain after the anesthetic effect disappears and other side effects caused by the type of anesthesia given during the surgical procedure (Pratama et al., 2024). After the anesthetic begins to disappear, the side effects felt by patients include a decrease in blood pressure, pulse, and nausea and vomiting (Supriyatin et al., 2022).

Nausea and vomiting are among the most common side effects after surgery (Gao et al., 2024). Nausea and vomiting may occur simultaneously or separately, and are often triggered by various factors such as intra-abdominal pressure and the physiological condition of the patient, for example pregnancy leading to reduced esophagogastric tone and increased intra-abdominal pressure. In addition, nausea and vomiting can also be affected by hypotension surgery (Fajar et al., 2023). This condition can be referred to as Postoperative Nausea and Vomiting (PONV). The incidence of PONV occurs in 30% of patients post general surgery. Although it is only nausea and vomiting, this condition can be detrimental to patients such as prolonged hospitalization in the hospital, increased wound infection,

longer wound healing, and increased risk of postoperative complications such as bleeding (Weibel et al., 2020).

The incidence of postoperative nausea and vomiting (PONV) in Indonesia has not been clearly recorded. This occurs because PONV is a non-life-threatening side effect. PONV is reported if it causes the patient's condition to worsen and requires further treatment. In addition, there are no national regulations governing such reporting. Hospitals only prepare reports for their own purposes (Anam et al., 2025).

The incidence of nausea and vomiting in post laparotomy gynecological patients was 31.25% and 31.4% in post mastectomy patients (Cing et al., 2022). Research conducted by (Abired et al., 2019) states that 89.4% of patients getting general anesthesia experience side effects in the first 24 hours such as nausea (10-40%), vomiting (10-20%), sore throat (25%), and surgical pain (30%). Another study found that of 40 respondents who met the criteria, 56.7% experienced mild PONV and 43.3% experienced moderate PONV (Cing et al., 2022). In contrast to research conducted by (Anisa et al., 2024) found that 53.8% of patients did not experience PONV, 28.7% experienced mild PONV, 12.5% experienced moderate PONV, and 5% severe PONV.

The incidence of postoperative nausea and vomiting (PONV) is different for each person because it is influenced by several factors that occur before surgery and during surgery. These factors include age, gender, BMI, physical status of the patient, previous history of PONV, history of motion sickness, type of action and anesthesia, and duration of surgery (Johansson et al., 2021). Research conducted by (Millizia et al., 2021) that there is an association of postoperative nausea and vomiting (PONV) with gender, smoking history, PONV history, type of anesthesia and duration of surgery. This event if sustained can cause esophageal rupture, dehydration, aspiration, open wounds, increase intracranial pressure (ICP), and cause longer supervision in the recovery room or Post Anesthesia Care Unit (PACU) (Ikhsan & Yunafri, 2020). This occurrence is also influenced by each patient's physical and psychological response to the procedure, which can affect the severity and frequency of postoperative nausea and vomiting.

Several factors that cause postoperative nausea and vomiting (PONV) in the above study, researchers are interested in conducting research with the aim of knowing the factors that influence the incidence of postoperative nausea and

vomiting in patients who get general and regional anesthesia in the IBS room of RSUD Tidar Kota Magelang.

Method

This study used a descriptive analytical survey research design with a cross-sectional approach. This study was conducted in Recovery Room of Central Surgical Installation (IBS) of Tidar Hospital, Magelang City. Before the surgery, all participants were explained the purpose, procedure, benefits, and risks of the study, and signed an informed consent before data collection. This study was conducted for two days in accordance with data collection policies in the operating room. The population in this study were all patients who underwent surgery on April 29 and 30, 2025 at 07.00-14.30 WIB as many as 55 people. Sample in this study were 48 respondents who met the criteria. The inclusion criteria in this study were postoperative patients, patients who received general and regional anesthesia, aged ≥ 17 years, and had complete medical record data. Exclusion criteria in this study were patients with decreased postoperative consciousness. The sampling technique in this study used consecutive sampling. The type of data in this study is primary data to determine the incidence of nausea and vomiting in postoperative patients and secondary data to determine the duration of surgery, type of anesthesia, and type of action given. PONV is categorized into three levels of severity. Mild PONV is characterized by one episode of vomiting or mild nausea. Moderate PONV occurs when the patient experiences 1-2 episodes of nausea or vomiting. Meanwhile, severe PONV is characterized by >2 episodes of nausea or vomiting. Data analysis techniques used were univariate and bivariate data analysis. Univariate data analysis uses frequency and percentage, and bivariate analysis uses Chi-square test to determine the relationship of several factors such as age, gender, BMI, duration of surgery, type of anesthesia, history of illness, history of PONV and motion sickness, and nausea vomiting (PONV).

Results and Discussion

Table 1. Respondent Characteristics (n=48)

Characteristics	f	%
Age		
≤ 17 years	0	0
18-59 years	38	79.2
≥ 60 years	10	20.8
Gender		
Male	20	41.7
Female	28	58.3
BMI		
< 18.5	0	0
18.5-25	31	64.6
> 25	17	35.4
Duration of surgery		
<1 hour	38	79.2
>1 hour	10	20.8

Type of anesthesia		
General	27	56.2
Regional	21	43.8
History of disease		
HT	10	20.8
DM	5	10.4
HT DM	1	2.1
Acid reflix	2	4.2
Heart	1	2.1
Pre-eclamsia	1	2.1
Vertigo	1	2.1
None	27	56.2
History of PONV/Motion sickness		
PONV	5	10.4
Motion sickness	5	10.4
None	38	79.2
Type of action		
General surgery	11	22.9
Pediatric surgery	1	2.1
Digestive surgery	2	4.2
Neurosurgery	1	2.1
Obsgyn	11	22.9
Urology	8	16.7
Onkology	3	6.25
Orthopedics	8	16.7
ENT	3	6.25
Total	**48**	**100**

Source: Primary data, 2025

Based on table 1, the distribution of gender is mostly female as many as 28 patients (58.3%) with the dominance of the age category in the age range of 18-59 years as many as 38 respondents (79.2%). Most respondents had BMI within normal limits, namely 18.5-25 as many as 31 respondents (64.6%). Most patients underwent general surgery and obstetrics and gynecology surgery (22.9% each), with the dominant use of general anesthesia and a procedure duration of generally less than 1 hour (79.2%). The most common medical history was hypertension (20.8%).Of all patients who became respondents, only 5 (10.4%) had a previous history of PONV.

Table 2. PONV Events (n=48)

PONV	f	%
None	38	79.2
Mild	8	16.7
Moderate	2	4.2
Severe	0	0
Total	**48**	**100**

Source: Primary data, 2025

Based on table 2, it was found that out of 48 respondents, 38 respondents (79.2%) did not experience nausea and vomiting, 8 respondents (16.7%) had mild nausea and vomiting, 2 respondents (4.2%) had moderate nausea and vomiting, and there was no severe nausea and vomiting.

Table 3. Relationship between Respondents' Characteristics and the Incidence of Postoperative Nausea Vomiting (PONV) (n=48)

Characteristics	Not PONV	Mild PONV	Mod PONV	p value
Age				
- ≤ 17 years	0	0	0	0.737
- 18-59 years	30	6	2	
- ≥ 60 years	8	2	2	
Gender				
- Male	15	0	1	0.057
- Female	23	8	1	
BMI				
- < 18.5	0	0	0	0.079
- 18.5-25	27	4	0	
- > 25	11	4	2	
Duration of surgery				
- <1 jam	35	3	0	0.001
- >1 jam	3	5	2	
Type of anesthesia				
- General	20	5	2	0.390
- Regional	18	3	0	
History of disease				
- HT	8	2	0	0.019

- DM	3	2	0	
- HT DM	1	0	0	
- Acid reflux	2	0	0	
- Heart	1	0	0	
- Pre-eclamsia	1	0	0	
- Vertigo	0	0	1	
- None	22	4	1	
History of PONV/Motion sickness				
- PONV	3	2	0	0.264
- Motion sickness	3	2	0	
- None	0	0	2	
Type of action				
- General surg.	9	1	1	
- Pediatric surg.	1	0	0	
- Digestive surg	1	1	0	
- Neurosurgery	0	0	1	
- Obsgyn	9	2	0	0.015
- Urology	8	0	0	
- Onkology	2	1	0	
- Orthopedics	6	2	0	
- ENT	2	1	0	

Source: Primary data, 2025

Based on table 3, it is found that the factors that influence the incidence of postoperative nausea and vomiting are the duration of surgery, medical history, and the type of action given. Bivariate analysis between the duration of surgery and the incidence of postoperative nausea and vomiting obtained a p value of 0.001, which means that there is a relationship between the duration of surgery and the incidence of postoperative nausea and vomiting in patients. Respondents who experienced mild PONV were the most respondents with a surgical duration of more than 1 hour as many as 5 respondents and those who experienced moderate PONV were 2 respondents. There were 35 respondents who did not experience PONV with a surgical duration of less than 1 hour. Bivariate analysis between medical history and the incidence of postoperative nausea and vomiting obtained a p value of 0.019, which means that there is a relationship between medical history and the incidence of postoperative nausea and vomiting. Respondents who experienced mild PONV were respondents who had a history of hypertension and diabetes mellitus with 2 respondents each. Respondents who experienced moderate PONV were respondents with a history of vertigo. Data analysis between the type of action performed and the incidence of postoperative nausea vomiting obtained a p value of 0.015 so that it can be interpreted that there is a relationship between the type of action performed and the incidence of postoperative nausea vomiting. Respondents who experienced mild PONV were respondents who received general surgery and neurosurgery.

Based on the results of the study, it was found that more than half of the respondents who underwent surgery were in the age group 18-59 years, namely the adult group as many as 38 respondents (79.2%). Research conducted by (Elsaid et al., 2021) also found that most of the respondents who underwent surgery were

aged 18-39 as many as 135 respondents (64%). The results showed that there was no significant relationship between age and the incidence of postoperative nausea and vomiting. The younger or older the age does not affect the incidence of PONV in patients. The results of this study are supported by research conducted by (Noviani et al., 2022) that age is not related to the incidence of nausea and vomiting in postoperative patients. Other studies also have the same results with a p value of 0.724 where p>0.05 which means there is no correlation between age and the incidence of nausea and vomiting in postoperative respondents (Cing et al., 2022).

Most of the respondents who received surgery in this study were female as many as 28 respondents (53.8%). This is in line with research conducted by (Ghosh et al., 2020) that more than half of the respondents who received surgery as many as 79 respondents were female (78.2%). The results of this study are also supported by research written by (Karnina & Salmah, 2022) that as many as 67 respondents after digestive surgery laparatomy surgery (64.4%) were female. The results of this study found that there was no relationship between gender and the incidence of Postoperative nausea and vomiting (PONV). Although there is no correlation with the incidence of PONV, the p value has a very slight difference with an Asymp sig p>0.05. The distribution data for the incidence of postoperative nausea and vomiting in this study were more female, namely 8 respondents. The process of PONV is caused by several stimulation pathways such as the ear area, gastrointestinal, sensory input, and CTZ (Chemoreceptor Trigger Zone). Stimuli originating from the CTZ are influenced by many things, one of which is from blood circulation. These stimuli have receptors in them such as histamine, serotonin, D2 dopamine, neurokinin-1, and cholinergic (Millizia et al., 2021).

Respondents in this study had a body mass index (BMI) in the range of 21-25, namely 26 respondents (54.2%). The results of this study are supported by research (Cing & Hardiyani, 2022) that almost most respondents have a body mass index in the normal range as many as 22 respondents (73.3%). The results of this study found that BMI has no correlation with the incidence of postoperative nausea and vomiting (PONV). The distribution of data on the BMI of these respondents was in the normal and overweight categories, and the results of data analysis showed no difference in the relationship between the

two categories with PONV. So, it cannot be concluded that BMI affects the incidence of postoperative nausea and vomiting in respondents. The results of this study are supported by research conducted by (Apipan et al., 2016) that no positive factors were found to show the relationship between BMI and the incidence of postoperative nausea and vomiting.

The most surgical procedures performed in this study were in the range of less than 1 hour, namely 38 respondents (79.2%). The results of this data analysis are supported by other studies that most of the surgery lasted around 30-60 minutes in 61 respondents (70.9%) (Millizia et al., 2021). The results of this study are also in line with research (Anisa et al., 2024) that as many as 40 respondents (50%) received surgery <60 minutes. The results of this study found that there was a correlation between the duration of surgery and the incidence of postoperative nausea and vomiting. Of the 48 respondents, 35 respondents received less than 1 hour of surgery and did not experience postoperative nausea and vomiting. This can be interpreted that from the relationship between these two variables, the shorter the duration of surgery, the smaller the risk of postoperative nausea and vomiting in patients. Vice versa, the longer the surgery on the patient, the higher the risk of the patient experiencing PONV (Johansson et al., 2021). According to (Millizia et al., 2021) the length of surgery makes the patient unable to change position due to the anesthetic given. Lack of body movement can cause blood accumulation and a dizzy sensation that causes stimulation of vestibular imbalance in the ear. If the vestibular is disturbed, the CTZ will be activated and cause nausea and vomiting in the patient.

The type of anesthesia given by respondents in this study was mostly general anesthesia, namely 27 respondents (56.2%). Respondents who experienced mild PONV mostly received regional anesthesia and respondents who experienced moderate PONV received general anesthesia. The results of this study are in line with other studies that 48 respondents (69.6%) who underwent surgery at Abdul Wahab Sjahranie Samarinda Hospital received general anesthesia (Hidayah et al., 2021). Data analysis in this category found that there was no relationship between the type of anesthesia given to patients and the incidence of PONV. Most of the surgical procedures in this study were less than 1 hour. As with the existing theory that the

side effects of general anesthesia are also influenced by the length of anesthesia used. The longer the duration of surgery requires a longer anesthetic action. This condition will cause the body to experience vasodilation due to suppression of the autonomic nervous system and decreased muscle tone (Hidayah et al., 2021). As a result, there will be a buildup of blood which causes an unbalanced vestibular condition and activates the CTZ as a trigger for postoperative nausea and vomiting.

This study found that more than half of the respondents did not have comorbidities as many as 27 respondents (56.2%) followed by hypertension as many as 10 respondents (20.8%). The results of data analysis between disease history and the incidence of PONV showed that there was a relationship between the history of diseases suffered by respondents and the incidence of postoperative nausea and vomiting. Of the 38 respondents who did not experience PONV, 22 of them did not have comorbidities. While 8 respondents who experienced mild PONV had a history of hypertension, diabetes mellitus, and the rest had no previous illnesses. The results of this study are in line with other studies that most patients with high MAP experience postoperative nausea and vomiting (Karlina, 2020).

The results showed that out of 48 respondents, only 5 respondents had a history of PONV and 5 other respondents had a history of motion sickness. The results of this study are in line with other studies that only 11 respondents (19.3%) had a history of motion sickness (Irawan et al., 2022). Because only a small proportion of respondents had a history of PONV and motion sickness, the data analysis found that there was no association between a history of PONV/motion sickness and the incidence of PONV in respondents. A history of PONV and motion sickness can be a precipitating factor for PONV because it can cause the release of catecholamines produced by the adrenal glands and can trigger alpha receptors in the nausea and vomiting regulatory center. Unbalanced conditions in the vehicle can cause changes in vestibular conditions in the ear so that it can trigger receptors such as histamine, acetylcholine, and hydroxytryptamine and cause nausea and vomiting in patients.

The types of procedures that were mostly performed were general surgery and obsgyn categories with the same number of respondents, namely 11 respondents (22.8%). Other procedures such as urology and orthopedics were performed by 8 respondents (16.7%). The remaining procedures such as oncology, ENT,

digestive surgery, neurosurgery, and pediatric surgery. The results of this study are comparable to research conducted by (Allene & Demsie, 2020) that more than half of the respondents received a type of surgery in the form of general surgery as many as 281 respondents (70.6%). Another study also had the same results that almost half of the respondents at Sundsvall's hospital, Sweden received general surgery as many as 911 respondents (45%) (Johansson et al., 2021). Data analysis in this category found that there was a relationship between the type of action taken and the incidence of nausea and vomiting in patients. Of the 8 respondents who experienced mild postoperative nausea and vomiting, 2 of them were obsgyn patients and 2 were orthopedic patients. The remaining four respondents were general surgery, digestive surgery, oncology, and ENT patients.

There are some limitations in this study. This study was only conducted for two days due to hospital policy, resulting in a limited number of samples. Researchers are advised to extend the study period to obtain a larger and more representative sample size.

Conclusion

Based on the results of research that has been conducted regarding factors that influence the incidence of nausea and vomiting in postoperative patients (PONV), it was found that the incidence of postoperative nausea and vomiting occurred in 16.7% of respondents in the mild category and 4.2% of respondents in the moderate category. This condition is influenced by several triggering factors such as the duration of surgery, the type of action performed, and medical history. The factors that proved not to be a contributing factor to postoperative nausea and vomiting in this study was age, BMI, type of anesthesia, and history of PONV/motion sickness.

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