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Prevalence And Risk Factors of Post-Operative Nausea and Vomiting in A Tertiary Care Hospital: A Cross-Sectional Observational Study

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ABSTRACT

BACKGROUND AND AIM: Post-operative nausea and vomiting (PONV) is an unpleasant and one of the most distressing symptoms frequently appearing during the first 24 hours after surgery. Besides the negative and unpleasant experience, PONV can lead to several surgical and systemic complications. It can result in electrolyte imbalance, dehydration, increased intracranial pressure, aspiration of gastric contents, bleeding and suture dehiscence. The Anaesthetist is usually blamed, despite evidence that PONV results from a variety of factors including patient characteristics, anaesthetic techniques, and the type of surgery and post-operative care. So our study aimed to determine the prevalence and identify the risk factors of post-operative nausea and vomiting in a tertiary care hospital.

METHODOLOGY: All patients above 18 years of age undergoing routine surgeries were selected from daily operation theatre lists and followed up post-operatively upto 24 hours for the presence or absence of PONV.

RESULTS: Prevalence of PONV in the study population was found to be 27.33%. There was association between female gender, non-smoker, surgery done under general anaesthesia, patients with history of PONV and motion sickness, use of volatile anaesthetics intra-operatively and use of post-operative opioids with the occurrence of PONV (95% CI, p-value 0.0002, 0.0047, 0.0091, 0.003, 0.009, 0.0004, 0.007 respectively). General, laparoscopic and breast surgeries showed a positive association with occurrence of PONV (95% CI, p-value 0.03, 0.0002, 0.0004 respectively).

CONCLUSION: Despite the use of antiemetics, whether single or dual, as part of the institutional protocol, the incidence of PONV remained high. Further research is needed to explore additional risk factors that may contribute to its occurrence.

KEYWORDS: Post operative nausea vomiting, prevalence, risk factors.

INTRODUCTION

Post-operative nausea and vomiting (PONV) occurs frequently as a distressing symptom which develops within the first 24 hours after surgery. The incidence of PONV affects 30% of unselected hospital patients but reaches 70% among patients considered at high risk. The unpleasant experience of PONV triggers multiple surgical and systemic complications. The condition leads to electrolyte imbalance and dehydration while also causing increased intracranial pressure and gastric content aspiration and bleeding and suture dehiscence. The chemoreceptor trigger zone (CTZ) located at the floor of the fourth ventricle serves as the main trigger for activating the vomiting centre. CTZ contains receptors that respond to dopamine, serotonin , opioids , acetylcholine and substance P neurotransmitters. The current

understanding of PONV risk factors remains limited because scientists have not yet fully understood the molecular biology behind these symptoms. Research now focuses on combining anti-emetic medications that work through multiple molecular pathways to manage PONV since a single drug has proven insufficient to address this problem completely. The use of multiple antiemetic medications leads to additional side effects and drug interactions as one of its main disadvantages.

The following study was designed with the aims of determining the prevalence of post-operative nausea and vomiting and to identify the risk factors for post operative nausea and vomiting in a tertiary care hospital. The objectives of the study include to collect data on the prevalence of PONV in a sample of patients who have undergone surgery in a tertiary care hospital, identify the risk factors for PONV in the sample of patients and to correlate the prevalence of PONV and the risk factors for PONV between different subgroups of patients.

MATERIALS AND METHODS

This observational study was carried out in Silchar Medical College and Hospital, Silchar, after approval from the institutional ethics committee and written informed consent from the patients. All patients above 18 years undergoing routine surgery under anaesthesia were enrolled for this observational study. During the study period, patients were taken from daily operation theatre (OT) list by systematic random sampling method. All enrolled patients underwent post-operative monitoring in the ward for 24 hours to assess PONV. The patients were considered as having nausea if "subjective sensation of an urge to vomit, in the absence of expulsive muscular movements", vomiting if "forcible expulsion of the gastric contents through the mouth" and retching if "unproductive effort to vomit". Presence of any one of the above symptoms were taken as a positive outcome.

Sample size: Considering 25% overall prevalence and 5% margin of error a total of 300 samples were calculated and considering 10% non response rate (300+30=330) 330 samples were required at 5% level of significance. 300 Patients above 18 years undergoing routine surgery ASA grade 1,2 and 3 of both sexes were taken. Patient who refused for participation (30 in this study), ASA grade 4, patients undergoing emergency surgeries and caesarean sections, pregnant patients in any trimester, patients requiring post operative mechanical ventilation, patients undergoing day care surgery and patients on chemotherapy were excluded from the study.

Patients admitted to the hospital for elective surgery were evaluated post-operatively for 24 hours in the respective post-operative wards. The following patient information were collected from the interview and hospital records: age, sex, body weight, height, anaesthetic risk classification (ASA criteria), previous history of nausea and vomiting, previous history of motion sickness, smoking history, surgical procedure, duration of surgery, type of anaesthesia administered, use of volatile anaesthetics and use of opioids in the post-operative period.

Data Analysis: All collected data were entered into "MS Excel 2010" and analysed using "SPSS version 21" to assess statistical significance. "Fisher's exact test" and "Chi-square test" were used to look at the association between categorical variables. "Descriptive statistics" were presented by using tables and bar diagram.
At 5% level of significance, Statistical significance between the groups was interpreted as follows:
• p value > 0.05 = not significant
• p value < 0.05= significant

RESULTS AND ANALYSIS

Demographic characteristics

Demographic characters	Male	Female
Number	163(54.33%)	137(45.67%)
Age(years)	38.7±15.3	45.3±17
Weight(kg)	59.8±10.5	54.9±10.4
Height(cm)	162.9±7.7	157±5.4
BMI(kg/m^2)	22.6±3.9	22.3±3.8
ASA 1 ASA 2 ASA 3	145 12 6	71 60 6

Table 1: The demographic information of the study participants is presented in the above table. The patient population included 163 males and 137 females. The male participants averaged 38.7 years old with 15.3 years standard deviation whereas female participants averaged 45.3 years old with 17 years standard deviation. The population showed average weights of 59.8 kilograms in males and 54.9 kilograms in females while their standard deviations reached 10.5 kilograms

and 10.4 kilograms respectively. The average height in males and females were 162.9 cm and 157 cm respectively with a standard deviation of 7.7 cm and 5.4 cm respectively. The BMI was 22.6±3.9 kg/m^2 and 22.3±3.8 kg/m^2 in males and females respectively.

Gender distribution

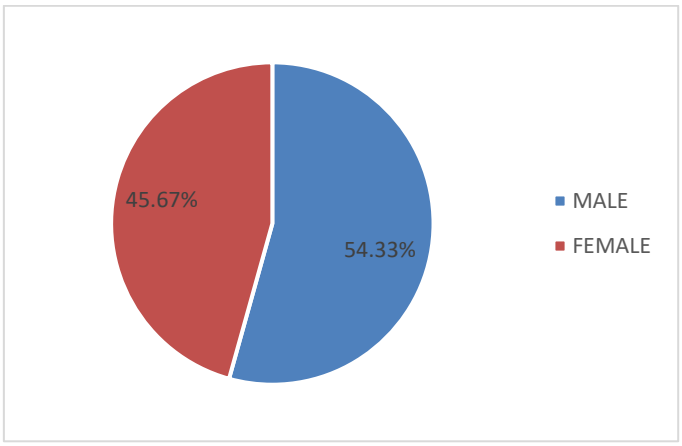

Figure 1: Pie chart showing gender distribution of the study population

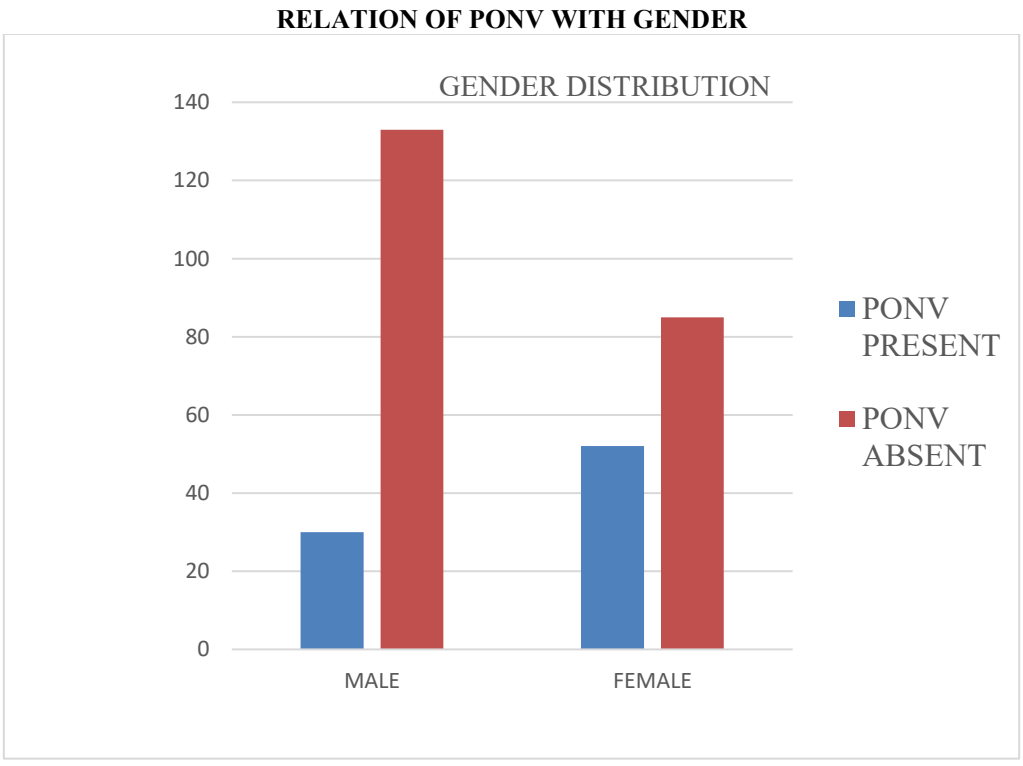

Figure 2: Bar Diagram showing incidence of PONV in male and female groups.

Gender	PONV present	PONV absent	Total	p value	Odds ratio
Male	30	133	163	0.0002	2.71
Female	52	85	137		

Table 2: This table shows the distribution of incidence of PONV in male and female groups. The p-value is 0.0002 at 95% CI which is statistically significant. So there was higher incidence of PONV in female patients in this study.

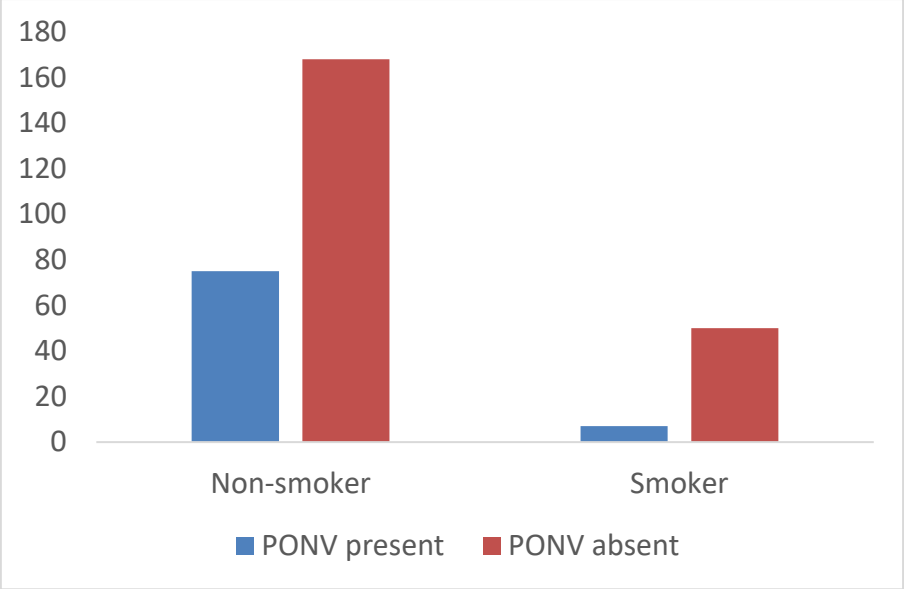

Figure 3: Bar Diagram showing incidence of PONV among smokers and non-smokers.

	PONV present	PONV absent	Total	p value	Odds ratio
Non-smoker	75	168	240	0.0047	3.18
Smoker	7	50	60		

Table 3: This table shows the incidence the PONV among smokers and non-smokers. The p-value was found to be significant (0.0047) at 95% CI. So non-smokers had more incidence of PONV.

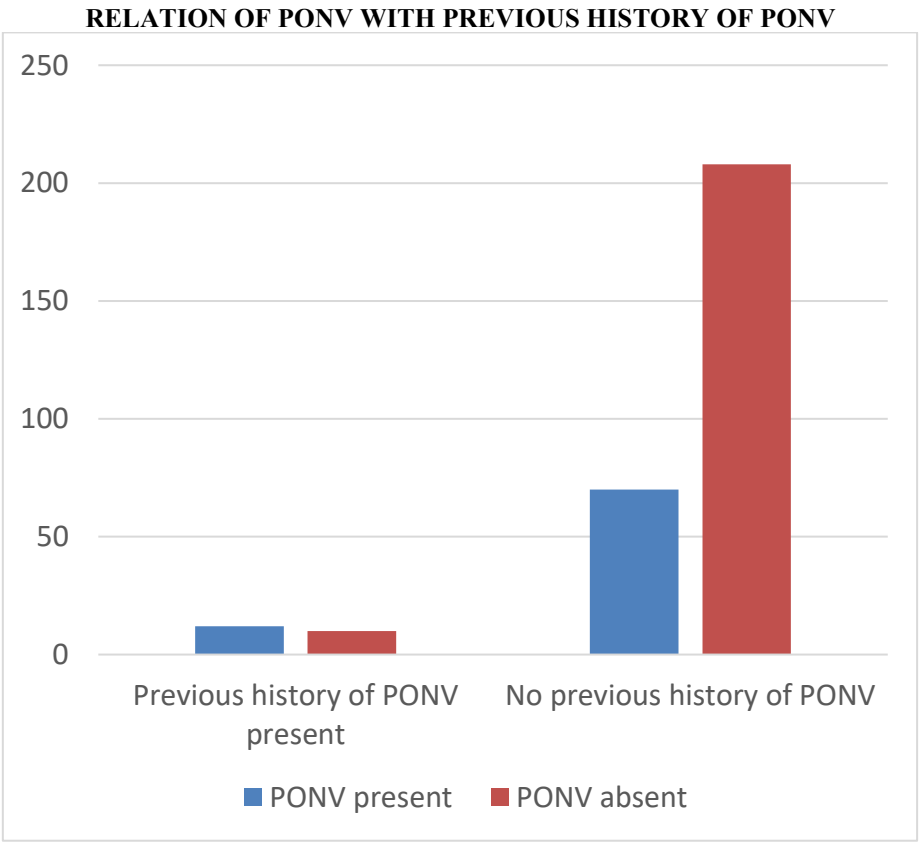

Figure 4: Bar diagram showing relation of PONV with previous history of PONV

Previous history of PONV	PONV present	PONV absent	Total	p value	Odds ratio
Present	12	10	22	0.003	3.56
Absent	70	208	278		

Table 4: Table showing the incidence of PONV among patients with and without previous history of PONV. There was higher incidence of PONV in patients with history of PONV in previous surgeries (CI 95%, p-value 0.003)

RELATION OF PONV WITH PREVIOUS HISTORY OF MOTION SICKNESS

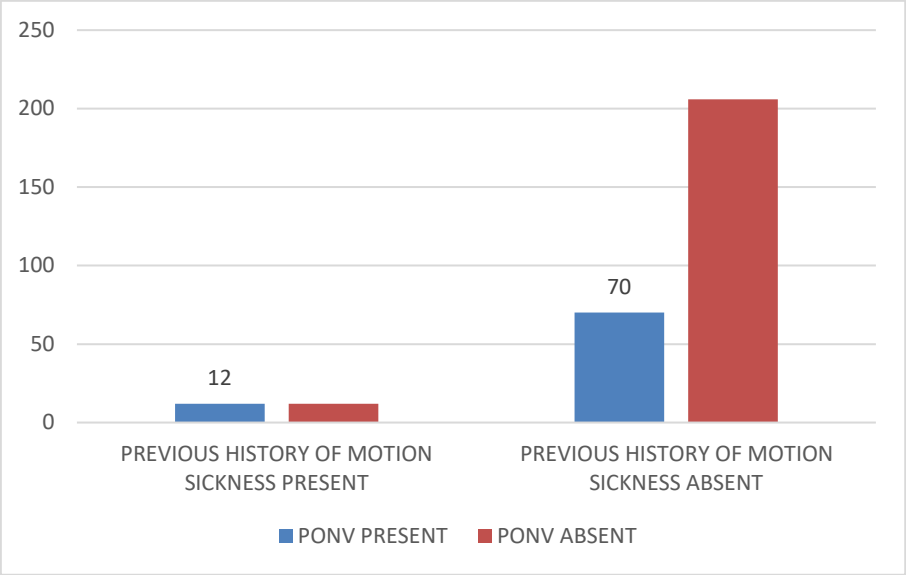

Figure 5: Bar diagram showing relation of PONV with patients having previous history of motion sickness.

PREVIOUS HISTORY OF MOTION SICKNESS	PONV PRESENT	PONV ABSENT	p value	Odds ratio
PRESENT	12	12	0.009	2.94
ABSENT	70	206		

Table 5: Table showing relation of PONV with patients having previous history of motion sickness. There was a strong association between PONV and previous history of motion sickness (CI 95% , p-value 0.009)

RELATION OF TYPE OF ANAESTHESIA WITH PONV

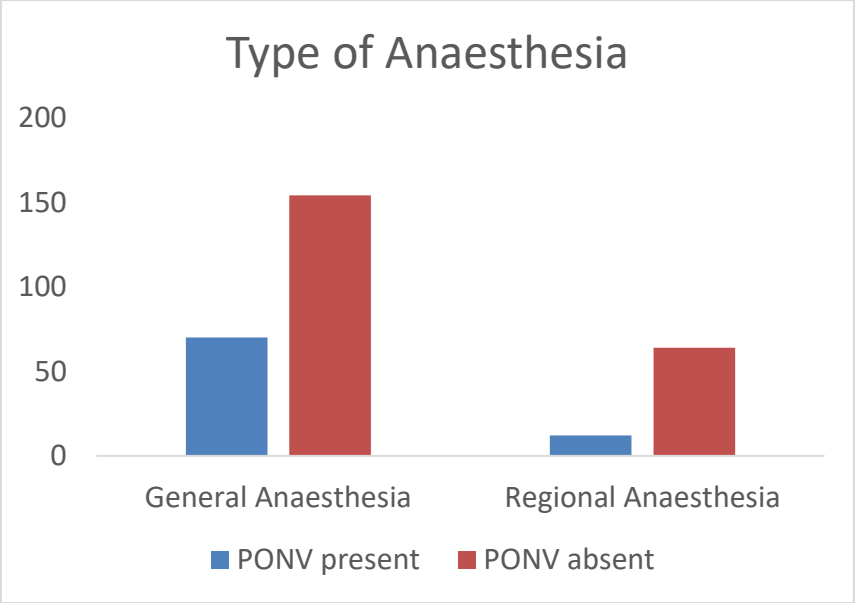

Figure 6: Figure showing relation between type of anaesthesia and PONV

Type of Anaesthesia	PONV present	PONV absent	p-value
General Anaesthesia	70	154	0.0091
Regional Anaesthesia	12	64	

Table 6: shows the incidence of PONV in different types of anaesthesia. It was seen that there was more incidence of PONV in patients undergoing surgeries under general anaesthesia (CI 95%, p-value 0.0091)

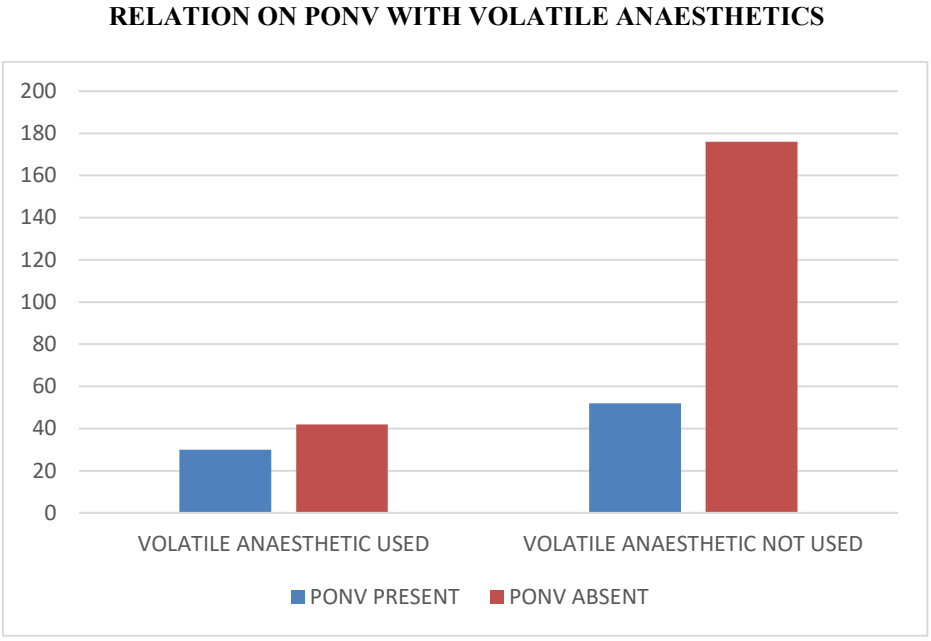

Figure 7: Bar diagram showing relation of PONV with use of volatile anaesthetics.

VOLATILE ANAESTHETIC	PONV PRESENT	PONV ABSENT	p value
USED	30	42	0.0004
NOT USED	52	176	

Table 7: Table shows the incidence of PONV among patients where volatile anaesthetics were used and where they were not used. There was significant association between use of volatile anaesthetics and occurrence of PONV (CI 95%, p-value 0.0004).

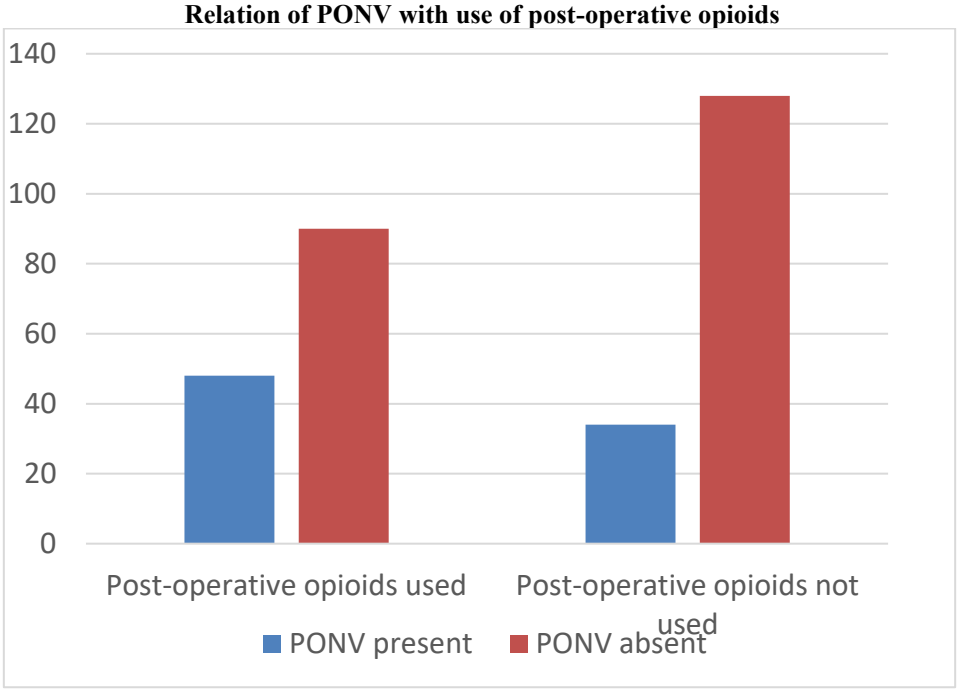

Figure 8: Bar diagram showing relation of PONV with the use of post-operative opioids.

Post-operative opioids	PONV present	PONV absent	p-value
Used	48	90	0.007
Not used	34	128	

Table 8: Table showing relation of PONV with the use of post-operative opioids. PONV was seen to be more common in patients where opioids were used in the post-operative period (CI 95%, p-value 0.007)

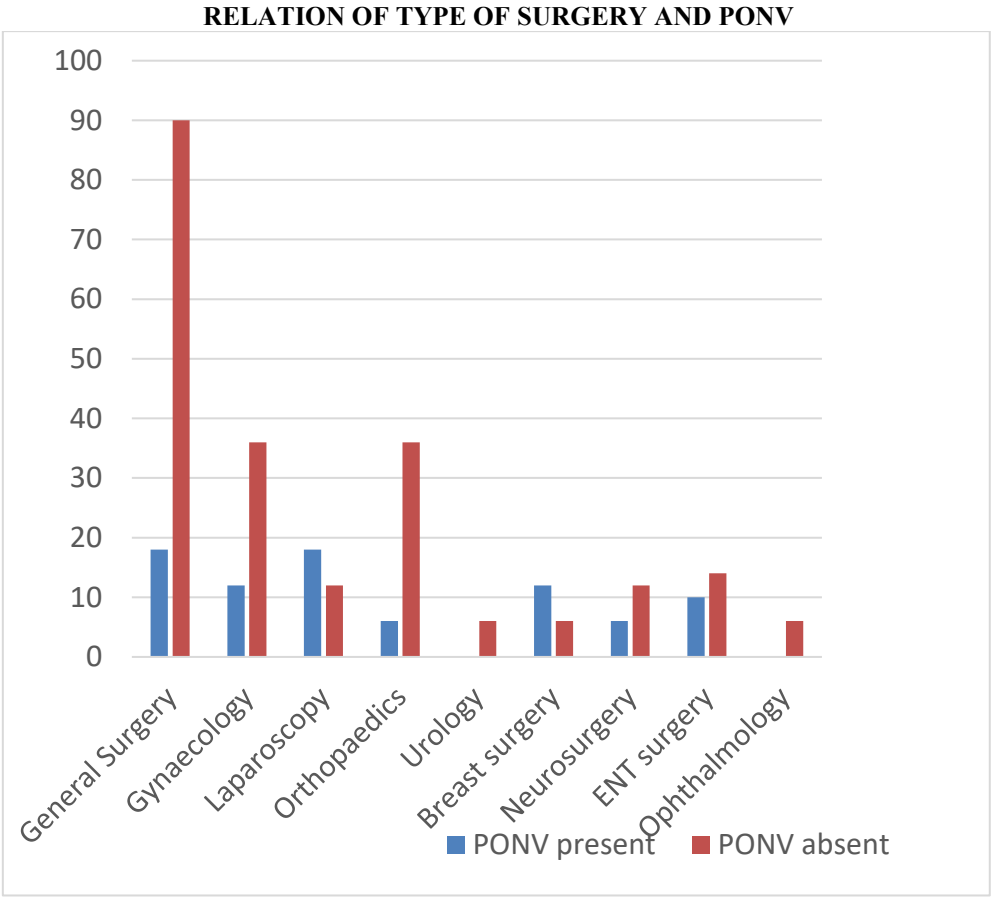

Figure 9: Figure showing relation between type of surgery and incidence of PONV.

Type of Surgery	PONV present	PONV absent	p-value
Breast surgery	12	6	0.0004
ENT surgery	10	14	0.13
General Surgery	18	90	0.03
Gynaecology	12	36	0.73
Laparoscopy	18	12	0.0002
Neurosurgery	6	12	0.58
Ophthalmology	0	6	0.34
Orthopaedics	6	36	0.07
Urology	0	6	0.34

Table 9: PONV was more in laparoscopic, breast, general surgeries (CI 95%, p-value 0.0002, 0.0004, 0.03 respectively).

DISCUSSION

Postoperative nausea and vomiting (PONV) significantly impact patient recovery and satisfaction in surgical care. Out of 300 patients enrolled for the study, 82 patients had PONV. So, the prevalence of PONV was 27.33%. The study revealed that female patients face a substantially higher PONV risk than male patients because their odds ratio reached 2.71. The research of Vikas Sinha et al. along with Lenka Doubravska et al. demonstrates this connection because of hormonal changes and diverse pain sensitivity among patients. The incidence of PONV stays consistent across different age groups except for a decreased risk level observed in patients above 80 years. Studies by Vikas Sinha et al. along with other reports show that age does not significantly affect PONV risk in patients. Non-smokers experience PONV at a higher rate compared to smokers according to statistical analysis (p = 0.0047). The CTZ becomes less

sensitive because of long-term nicotine exposure. Medical experts do not endorse smoking as a preventive method because it presents severe health dangers to patients. Patients who experienced PONV before or had motion sickness have an elevated risk of PONV ($p = 0.009$). Literature shows a clear association between this condition and its future recurrence potential. Research did not establish a connection between BMI and PONV occurrence ($p = 0.11$) despite conflicting evidence about obesity and low BMI affecting susceptibility. ASA 1 patients experienced the most PONV cases yet a statistical link between PONV and ASA classification failed to materialize ($p = 0.068$). Healthier patients may metabolise anaesthetic drugs differently and thus affecting PONV risk . General anaesthesia leads to increased PONV occurrence than regional anaesthesia based on statistical significance ($p = 0.0091$). Medical research demonstrates that volatile anaesthetic agents and opioid drugs in general anaesthesia increase PONV risk but regional anaesthesia techniques help reduce this risk. The analysis of anaesthesia duration against PONV incidence showed no meaningful relationship ($p = 0.77$) indicating that other treatment agents and patient-specific risks have a greater impact on PONV development. The use of volatile anaesthetics resulted in a statistically significant increase of PONV occurrence ($p = 0.0004$). The recommended preventive measure for PONV involves total intravenous anaesthesia (TIVA) administration with propofol. The administration of opioid analgesics leads to increased PONV risk ($p = 0.007$) which verifies their ability to activate the CTZ. The combination of multiple pain treatment approaches helps decrease PONV caused by opioids.

PONV was more in laparoscopic, breast, general surgeries (CI 95%, p-value 0.0002, 0.0004, 0.03 respectively). The association between PONV and ENT surgery remained inconclusive according to our research findings ($p = 0.13$). The research conducted by David R Sinclair et al (1999) established that patients undergoing ENT surgeries developed PONV more frequently. Other research findings demonstrate that breast surgeries together with laparoscopic procedures and ENT procedures represent the groups at highest risk for PONV.

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CONCLUSION

The symptom of PONV ranks among the most unpleasant postoperative conditions where vomiting stands as the most bothersome and nausea places fourth. The prevention of PONV leads to better patient life quality while decreasing both emergency hospitalizations and healthcare expenses.

From our study it can be concluded that nausea and vomiting are common in post-operative patients. The major risk factors were, female gender, non-smokers, previous history of PONV and motion sickness, general anaesthesia, use of volatile anaesthetics, use of opioids in post-operative period, laparoscopic, breast and general surgeries.

BIBLIOGRAPHY

1. Sinha V, Vivekanand D, Singh S. Prevalence and risk factors of post-operative nausea and vomiting in a tertiary-care hospital: A cross-sectional observational study. *Med J Armed Forces India*. 2022 Sep;78:(Suppl)158–62.
2. Le TP, Gan TJ. Update on the Management of Postoperative Nausea and Vomiting and Postdischarge Nausea and Vomiting in Ambulatory Surgery. *Anesthesiol Clin*. 2010 Jun 1;28(2):225–49.
3. Park JW, Jun JW, Lim YH, Lee SS, Yoo BH, Kim KM, Yon JH, Hong KH. The comparative study to evaluate the effect of palonosetron monotherapy versus palonosetron with dexamethasone combination therapy for prevention of postoperative nausea and vomiting. *Korean J Anesthesiol.* 2012 Oct;63(4):334–9. doi:10.4097/kjae.2012.63.4.334.
4. Apfel CC, Kranke P, Katz MH, Goepfert C, Papenfuss T, Rauch S, et al. Volatile anaesthetics may be the main cause of early but not delayed postoperative vomiting: a randomized controlled trial of factorial design †. *Br J Anaesth.* 2002 May;88(5):659-68.
5. Bhargava KP, Dixit KS. Role of the chemoreceptor trigger zone in histamine-induced emesis. Br J Pharmacol. 1968 Nov;34(3):508-13.
6. Šimurina T, Mraovic B, Skitarelić N, Andabaka T, Sonicki Z. Influence of the menstrual cycle on the incidence of nausea and vomiting after laparoscopic gynecological surgery: a pilot study. J Clin Anesth. 2012 May;24(3):185-92.
7. Singh PM, Borle A, Rewari V, et al. Aprepitant for postoperative nausea and vomiting: a systematic review and meta-analysis. Postgrad Med J. 2016;92(1084):87-98.
8. Bettie WS, Lindblad T, Buckley DN, et al. The Incidence of Postoperative Nausea and Vomiting in Women Undergouing Laparoscopy is Influenced by the Day of the Menstrual Cycle. Can J Anaesth 1991; 38:298–302.
9. Scuderi PE, Conlay LA. Postoperative nausea and vomiting and outcome. Int Anesthesiol Clin. 2003;41:165e174.
10. Gan TJ. Risk factors for postoperative nausea and vomiting. Anesth Analg. 2006;102:1884e1898.
11. Horn CC. Why is the neurobiology of nausea and vomiting so important? Appetite. 2008 Mar-May;50(2-3):430-4.
12. Kovac AL. Prevention and Treatment of Postoperative Nausea and Vomiting. Drugs 2000; 59:213–243