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Postoperative Nausea and Vomiting: A Descriptive Study

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Abstract **Original Research Article**

Postoperative Nausea and Vomiting (PONV) remains a problem, despite an evident clinical perception that their severity has diminished. We conducted a descriptive study in post-operative units in Sylhet M.A.G. Osmani Medical College and Hospital, Sylhet, Bangladesh during the period from January 2020 to December 2020. We aimed to find out the incidence of postoperative nausea and vomiting in patients aged 3–79 years. Nausea, emetic episodes, and the need for anti-emetic medication were recorded for 24 h postoperatively. In the postoperative unit, the incidence of nausea and vomiting was 32% and 12%, respectively. Over the whole 24-h period, these figures were 47% and 34%, respectively; severe nausea was experienced by 13%. The highest incidence of emetic sequelae was observed in gynecological patients; 52% of the patients who received general anesthesia and 38% of the patients who received regional anesthesia reported nausea. The most important predictive factors associated with an increased risk for nausea and vomiting were female gender, a previous history of postoperative sickness, a longer duration of surgery, smoking, and a history of motion sickness. Based on these five items, a simple score predicting the risk of nausea and vomiting was constructed with a moderately good discriminating power. Once the efficacy of agents or their combination has been established against stratified risk groups, it would then be appropriate to explore the risk-benefit of routine prophylactic antiemetic therapy.

Keywords: Post-operative, Vomiting, Nausea, anesthesia.

INTRODUCTION

Nausea and emetic episodes persist as the most common complaints following anesthesia and surgery. Many adults find postoperative nausea and vomiting even more distressing than postoperative pain. The overall incidence of postoperative nausea and vomiting in the recovery room is around 10% but ranges from 20% to 30% during the first 24 h after surgery according to recent reports [1-4]. Despite the advances in modern anesthetic practice and surgical techniques, there is still room for improvement in identifying the causative factors as well as in the prophylaxis and treatment of this problem. The assessment intervals were 0– 2 h and 2–24 h; the first 2 hours were spent in the recovery room and the remainder mostly in the surgical ward. The anesthetic nurses completed the items on the surgical procedure, and the premeditation and the anesthetic is given. They also recorded medication for postoperative pain and possible postoperative nausea and vomiting and its treatment after the 2-h assessment in the recovery room. The questionnaire accompanied each patient's medical report to the ward. The patients were interviewed on the first postoperative day, 24 h after the operation, and the anesthetic records were reviewed to ensure the completeness of the collected data. All interviews were conducted by one of the authors. Before visiting the patient, the interviewer recorded data from the medical notes about pain medication, emetic episodes, and anti-emetics used. During the interview, the patients were asked, in addition to their background characteristics, about the presence and intensity of nausea, vomiting, and pain, any feeling of fatigue or drowsiness postoperatively, and their overall satisfaction with the given treatment, including surgery, anesthesia, and postoperative care. Nausea was evaluated by the patient's subjective sensation of feeling sick or wishing to vomit. Nausea was assessed using an 11-point rating scale (0, no nausea; 10, as bad nausea as possible). Emetic episodes were recorded separately as retching or vomiting. The patients were also questioned regarding

contexts in which emetic symptoms occurred. The intensity of pain was evaluated as an average during the 24-h assessment period and also at the time of the interview on an 11-point scale (0, no pain; 10, worst pain imaginable). Postoperative fatigue judged as an average during the assessment period was ascertained using a scale ranging from 0, no fatigue at all, to 10, as bad fatigue as possible. These 11-point scales were subsequently graded into four levels: 0, none; 1–3, mild; 4–6, moderate and 7–10, severe.

OBJECTIVE

a) **General Objective**

- To estimate the incidence of postoperative nausea and vomiting.

b) **Specific Objectives**

- To analyze the predictive factors associated with these symptoms.
- To analyze key anesthetic and surgical factors associated with these symptoms.

METHODOLOGY AND MATERIALS

This was a prospective descriptive study to estimate the incidence of postoperative nausea and vomiting. We conducted a descriptive study in post-operative units in Sylhet M.A.G. Osmani Medical College and Hospital, Sylhet, Bangladesh during the period from January 2020 to December 2020. We collected data from several types of common surgical procedures in selected hospitals. The study In-patients scheduled to undergo elective surgery requiring general or regional anesthesia and follow-up for the first 2 hours in the recovery room were enrolled in the study. Both genders were included, but pregnant patients and those requiring treatment in the intensive care unit were not studied. All patients during this period who met the inclusion criteria and gave their informed consent entered the study. The anesthetic staff was instructed to keep records of nausea and vomiting. All statistical calculations were performed by the SPSS for Windows (version 6.1.3.) statistical package.

RESULTS

Questionnaires and interviews were completed for 200 patients, of whom 50 (50%) were male and another 50% were females. The distribution of the inpatients within the surgical departments and different procedures is shown in the tables. In the general anesthesia group, the proportion of females was greater than in the regional anesthesia group.

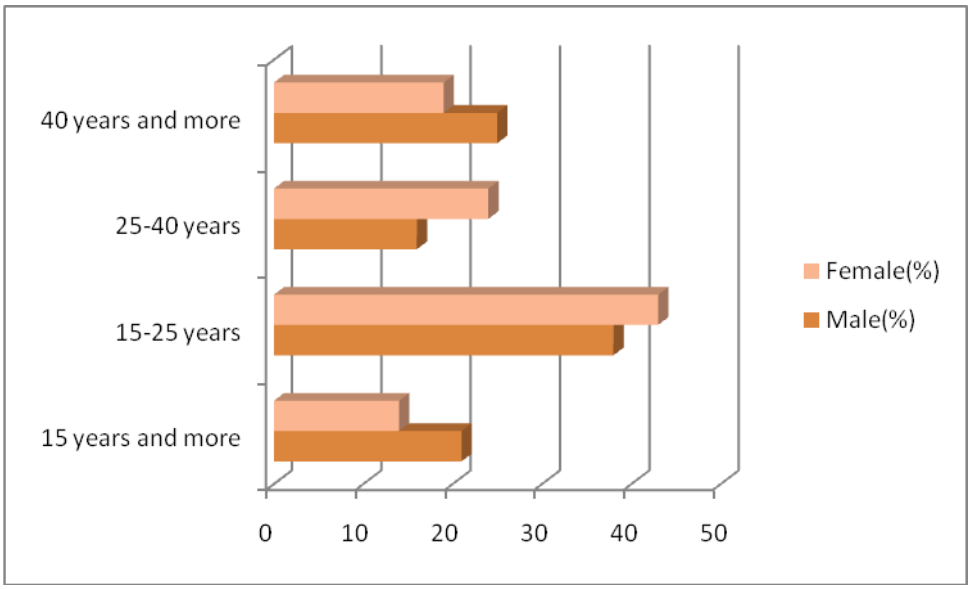

Figure 1: Age and sex distribution of the study participants (n=200)

Table 1: Demographic data of the patients for the different types of surgery and anesthesia (n=200)

	GYN	OTO	OPHT	GEN	Total
Characteristic	64	28	14	94	**200**
Age, median; years	38	26	46	51	
(range)	(15–76)	(3–75)	(6–76)	(13– 82)	
Body mass index; kg.m^{-2}, mean	23.8	24.4	22.7	26.9	
Current daily smokers; %	26	14	17	22	
History of migraine; %	23	12	7	14	
in childhood only	24	31	20	22	
as adult also	15	8	4	9	

	GYN	OTO	OPHT	GEN	Total
Previous GA; %	77	65	72	72	
in previous GA; %	49	43	31	41	
Previous RA; %	94	84	87	93	
median	80	35	83	73	
(Q1, Q3)	(47, 113)	(23,100)	(61, 142)	(45, 105)	
Use of postoperative opioids; %	68	75	43	69	

Table 2: Distributions of procedures (Departments) of surgery among study participants (n=200)

Department	Procedure	Male (%)	Female (%)	Total (%)
Gynaecology & Intra-abdominal	Laparoscopy	8	25	33
	Laparotomy	10	18	28
	Vaginal surgery	—	4	4
Otolaryngology	Tonsillectomy	4	7	11
	Nose and sinus surgery	9	4	13
	Aural surgery	1	1	2
Ophthalmology	Strabismus surgery	3	1	4
	Intra-ocular surgery	6	3	9
General surgery	Cornea surgery	12	13	25
Orthopaedic:	Joint replacement	8	5	13
	Lower limb surgery	17	9	26
	Upper limb surgery	9	5	14
	Spinal surgery	13	5	18
Total		**100**	**100**	**100**

Table 3: The percentage of patients with nausea, vomiting, and in different types of surgery

0–2 hours in the recovery room					
Nausea					
Vomiting					
2-24 hours onward					
Nausea	60	51	36	46	49
Vomiting	31	27	13	22	24

(70% vs. 55%), in which the patients were generally older with higher ASA physical status. Other characteristics in both anesthesia groups were quite similar. The tracheas of all patients who were operated upon under general anesthesia were intubated and ventilation was controlled. Anesthesia was induced with thiopentone in 87% of cases and with propofol in 13% of cases. Every patient received muscle relaxation and intra-operative opioids (fentanyl in 98% of cases). General anesthesia was maintained with a volatile anesthetic (most commonly isoflurane) in nitrous oxide and oxygen or oxygen-enriched air. Supplemental boluses of fentanyl were given as required. Postoperative pain was treated with intramuscular or intravenous opioids (oxycodone) in 57% of patients and with epidural opioids in 14% of patients. Opioids were used less after ophthalmological operations than after other types of surgery and less after regional than general anesthesia (Table 2). 29% of all patients received only nonsteroidal anti-inflammatory drugs for pain relief. Male and female patients were fairly comparable with respect to age and pre-operative condition, apart from some disparity in the following presumed prognostic factors for postoperative nausea and vomiting: a history of migraine was more common in females (20% vs. 7% in males); a history of motion sickness, either in childhood only or in adult life as well, was reported by 26% and 13% of females (the figures for males being 20% and 4%, respectively); the proportions of females with postoperative nausea and vomiting after the previous general and regional anesthesia were 50% and 14%, respectively, and those of males 25% and 6%, respectively; 30% of males and 18% of females were regular smokers. Emetic outcomes related to surgery. The overall incidences of postoperative nausea and vomiting in the total patient population were 52% and 25%, respectively. Postoperatively, anti-emetics were given to 31% of patients (Table 3).

During the first 2 hours after surgery, nausea was experienced by 18% of all patients and 5% vomited (26% of the patients reported nausea). The highest number of vomiting episodes was three in seven patients. The highest incidence of nausea (27%) was reported in gynecology patients, of whom 21% were treated with antiemetic medication (Table 3). During the second observation period from 2 to 24 h postoperatively, the proportions of patients with nausea and vomiting in the whole population were 49% and

24%, respectively. Of all the patients reporting nausea, 49% also vomited. Severe vomiting (more than three episodes) occurred in 56 patients. Again, the rates were highest in the gynecology patients (nausea at 60% and vomiting at 31%), but also half of the otolaryngological patients suffered from nausea (Table 3). Among the separate types of surgery, the highest incidence of nausea appeared in gynecological laparotomy (73%), joint replacement (61%), and general surgical laparoscopy (58%); of these nauseated patients, 41%, 70%, and 47%, respectively, also vomited. The proportion of ophthalmological patients with emetic sequelae was relatively low. Vomiting was treated with anti-emetics more often than nausea only. In most cases, nausea assessment was mild with no differences in median nausea scores (calculated for patients with nausea) between surgical departments (Table 4). The median (interquartile range) nausea score was 4.0 (2.0, 6.0) in all the other surgical departments but in general surgery, the figure was Logistic modeling and risk scores The forward procedure of analysis selected the following factors as predictors of the incidence of nausea among adult patients: gender, previous experience of postoperative nausea and vomiting, duration of surgery, history of motion sickness, smoking, use of opioids postoperatively type of anesthetic, obesity, history of migraine and ASA.

Table 4: The distribution (%) of the severity of nausea as assessed by the patients on the ward (2–24 h), by the type of surgery, anesthetic technique, and gender

Gynecological (n ¼ 242)	40	29	21	10
Otolaryngological (n ¼ 135)	49	24	16	11
Ophthalmological (n ¼ 76)	64	15	16	5
General surgical (n ¼ 654)	54	23	16	7
Type of anesthesia				
General (n ¼ 822)	48	25	18	9
Regional (n ¼ 285)	62	20	11	7
Gender				
Male (n ¼ 377)	68	17	11	4
Female (n ¼ 730)	43	27	20	10
Total (n ¼ 1107)51		**24**	**17**	**8**

DISCUSSION

This survey was designed to investigate the incidence of postoperative emetic sequelae and to ascertain the degree of discomfort after everyday surgery with modern anesthetic and surgical techniques. Our findings indicate that the occurrence of nausea and vomiting is still surprisingly high, especially in the general ward and for some patients, it may be the worst part of the whole procedure. Although the incidence of nausea was high, the proportion of severe nausea was generally below 10%. About half of the patients with nausea also vomited. This study was conducted by personally interviewing all the subjects during the first postoperative day while still in the hospital, thus reducing the risk of memory lapse found with subsequently self-completed questionnaires. The patients were questioned regarding their symptoms, mostly by the same investigator, in a consistent manner. The intensity of nausea, as perceived by the patient, can be measured only by a subjective scale, and the same approach was chosen as with pain evaluation [7, 8]. These aspects in measurements might elicit the true proportion of patients with emetic symptoms and are following the study conducted by Cohen *et al.*, [3]. In interpreting our results some factors must be taken into consideration. The proportion of females was twice that of males and men generally are less susceptible to nausea [1-4]. The proportion of gynecological patients contributed to the imbalance of gender distribution, as well as to the high overall rate of nausea. Nausea and vomiting in females were about twice as common as in males. Similar findings have been described recently [3, 4, 9]. Severe nausea was more common in females, who were also far more often treated with anti-emetics than were men. Seventy-four percent of our patients were operated upon under general anesthesia, which is known to provoke more emetic reactions than regional anesthesia [2, 4]. This may have increased the overall incidence of postoperative nausea and vomiting although the anesthetic techniques used were representative of current practice elsewhere. In this population, the incidence of nausea and vomiting after regional anesthesia (mostly spinal) was greater than that reported by Carpenter *et al.*, [10], but our sample size in this group was too small to exclude chance variation. Our practice of using opioids and sedatives in association with some regional blocks may also have contributed to the unexpectedly high rate of nausea in these patients. Over one-third of our nauseated patients associated the sensation with movement, either active or passive. Kamath *et al.* reported that 66% of their patients who could identify a cause for postoperative nausea blamed movement [11]. Muir *et al.* suggested that the increase in postoperative nausea and vomiting after leaving the recovery room might be related to patient transport [12]. Opioids are considered to sensitize the vestibular organ to movement-induced emesis [2, 13]. According to Andersen & Krohg [14], opioids are seldom the cause of postoperative nausea if

the patient is immobile. They also pointed out that nausea frequently accompanied pain in the early postoperative period and the relief of pain with opioids resulted in relief of nausea as well. Quinn *et al.*, reported significantly higher mean pain scores in nauseated patients [4]. Our survey confirmed female gender, a history of previous postoperative emetic sequelae, and a history of motion sickness as the most important patient-related risk factors for postoperative nausea and vomiting. These items were also included in the risk score model of Palazzo & Evans [6] developed for a specific patient group under- going minor orthopedic surgery. In addition, we found smoking and the duration of operation among the five most important determinants of postoperative nausea and vomiting not considered by Palazzo & Evans. On the other hand, their strongest individual predictor was the use of opioids in postoperative pain management, which was the sixth predictor in our analysis. In spite of the differences in the study populations and items included in the prediction model, the performance of the score of Palazzo & Evans was only slightly worse than ours.

We were not able to detect any clear effect of age on nausea but, in females, increasing age was associated with some increased risk. Our sample of children was far too small to draw any conclusions about the incidences of postoperative nausea and vomiting. Obesity showed only a minor effect on nausea in females. A lack of the influence of body mass index on nausea has also been reported recently [3, 15]. Smokers had a decreased risk of nausea and vomiting, a fact also observed by Cohen *et al.*, [3].

Limitations of the Study

The study was conducted in a single community with a limited sample size. So, study results may not reflect the scenarios of the whole country.

Conclusion and Recommendations

Management of postoperative nausea and vomiting is important for public health practitioners. The highest incidence of emetic sequelae was observed in gynecological patients. The most important predictive factors associated with an increased risk for nausea and vomiting were female gender, a previous history of postoperative sickness, a longer duration of surgery, smoking, and a history of motion sickness. This survey does not support the current clinical impression of a decreased incidence of postoperative nausea and vomiting after surgery. However, this survey has enhanced our awareness of postoperative sickness and raised the possibility of recognizing patients at risk for nausea pre-operatively, using a few simple individual characteristics. Applying risk scoring in order to improve the patient outcome, anti-emetics given prophylactically to patients with a high probability of emesis could prevent or at least reduce these adverse symptoms.

References

1. Lerman, J. (1992). Surgical and patient factors involved in postoperative nausea and vomiting. *British Journal of Anaesthesia*, 69(Suppl. 1), 24–32.
2. Watcha, M. F., & White, P. F. (1992). Postoperative nausea and vomiting. Its etiology, treatment, and prevention. *Anesthesiology*, *77*(1), 162-184.
3. Cohen, M. M., Duncan, P. G., DeBoer, D. P., & Tweed, W. A. (1994). The postoperative interview: assessing risk factors for nausea and vomiting. *Anesthesia and analgesia*, *78*(1), 7-16.
4. Quinn, A. C., Brown, J. H., Wallace, P. G., & Asbury, A. J. (1994). Studies in postoperative sequelae. Nausea and vomiting—still a problem. *Anaesthesia*, *49*(1), 62-65.
5. Hanley, J. A., & Mcneil, B. J. (1982). The meaning and use of the area under an ROC curve. *Radiology*, 143, 29–36.
6. Palazzo, M., & Evans, R. (1993). Logistic regression analysis of fixed patient factors for postoperative sickness: a model for risk assessment. *British journal of anaesthesia*, *70*(2), 135-140.
7. Melzack, R., Rosberger, Z., Hollingsworth, M. L., & Thirlwell, M. (1985). New approaches to measuring nausea. *CMAJ: Canadian Medical Association Journal*, *133*(8), 755-8.
8. Korttila, K. (1992). The study of postoperative nausea and vomiting. *British Journal of Anaesthesia*, *69*, 20S-23S.
9. Larsson, S., & Lundberg, D. (1995). A prospective survey of postoperative nausea and vomiting with special regard to incidence and relations to patient characteristics, anesthetic routines and surgical procedures. *Acta anaesthesiologica scandinavica*, *39*(4), 539-545.
10. Carpenter, R. L., Caplan, R. A., Brown, D. L., Stephenson, C., & Wu, R. (1992). Incidence and risk factors for side effects of spinal anesthesia. *Anesthesiology*, *76*(6), 906-916.
11. Kamath, B., Curran, J., Hawkey, C., Beattie, A., Gorbutt, N., Guiblin, H., & Kong, A. (1990). Anaesthesia, movement and emesis. *BJA: British Journal of Anaesthesia*, *64*(6), 728-730.
12. Muir, J. J., Warner, M. A., Offord, K. P., Buck, C. F., Harper, J. V., & Kunkel, S. E. (1987). Role of nitrous oxide and other factors in postoperative nausea and vomiting: a randomized and blinded prospective study. *Anesthesiology*, *66*(4), 513-518.
13. Rabey, P. G., & Smith, G. (1992). Anaesthetic factors contributing to postoperative nausea and vomiting. *British Journal of Anaesthesia*, *69*, 40S-45S.
14. Andersen, R., & Krohg, K. (1976). Pain as a major cause of postoperative nausea. *Canadian Anaesthetists' Society Journal*, *23*(4), 366-369.

15. Haigh, C. G., Kaplan, L. A., Durham, J. M., Dupeyron, J. P., Harmer, M., & Kenny, G. N. C. (1993). Nausea and vomiting after gynaecological surgery: a meta-analysis of factors affecting their incidence. *British journal of anaesthesia*, *71*(4), 517-522.