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INCIDENCE OF POSTOPERATIVE NAUSEA AND VOMITING FOLLOWING SPINAL ANESTHESIA IN PATIENTS UNDERGOING ELECTIVE UROLOGICAL SURGERY

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Abstract

Background: *Postoperative nausea and vomiting (PONV) is a common and distressing complication following anesthesia and surgery, significantly affecting patient comfort, recovery, and overall satisfaction. Although spinal anesthesia is widely used in elective urological surgeries due to its safety and effectiveness, PONV remains a notable concern even in the absence of general anaesthesia.*

Objectives: *To determine the incidence of PONV and assess associated risk factors in patients undergoing elective urological surgery under spinal aesthesia.*

Materials and methods: *A descriptive cross-sectional study was conducted at the Institute of Kidney Diseases (IKD), Peshawar, over 4–6 months. A total of 165 patients (ASA I–II) were included using convenient sampling. Data were collected via questionnaire, and patients were observed for 24 hours postoperatively*

Results: *The mean age of participants was 40.7 ± 14.4 years. Among the patients, 38.2% experienced nausea, with most cases being mild (59.4%). Vomiting was reported in 50.3% of patients, with the majority experiencing 2–3 episodes. Most vomiting episodes occurred within the first 2 hours postoperatively. Additionally, 50.9% of patients required rescue antiemetic therapy. These findings indicate that PONV remains a frequent complication even under spinal anesthesia.*

Conclusion: *PONV is a frequent early postoperative complication after spinal anesthesia in urological surgery. Proper risk assessment and timely management are essential to improve patient outcomes.*

INTRODUCTION

Postoperative nausea and vomiting (PONV) remain one of the most common and distressing complications following anesthesia and surgery, significantly affecting patient comfort, recovery, and overall satisfaction with perioperative care. Despite advances in anesthetic techniques and the availability of effective antiemetic medications, PONV continues to be a major clinical concern

(1). The incidence of PONV in the general surgical population ranges from 20% to 35% and may increase to approximately 40% among high-risk patients. In addition to causing discomfort, PONV is associated with delayed recovery, prolonged hospital stay, increased healthcare costs, and complications such as dehydration, electrolyte imbalance, and aspiration (2). Spinal anesthesia is widely used in elective urological procedures, including transurethral resection of the prostate, bladder surgery, and ureteroscopic interventions, because of its rapid onset, effective analgesia, reduced systemic drug exposure, and avoidance of airway manipulation. Although regional anesthesia is generally associated with a lower incidence of postoperative nausea and vomiting than general anesthesia, PONV remains a significant problem among patients receiving spinal anesthesia (3). Recent studies have reported an incidence ranging from 22% to 35% in patients undergoing surgery under spinal anesthesia. This persistence suggests that factors other than airway manipulation contribute to the development of PONV in these patients (4).

The pathophysiology of PONV is complex and multifactorial, involving interactions between central and peripheral neural pathways that regulate the emetic response (5). The vomiting center located in the medulla receives input from the chemoreceptor trigger zone, vestibular system, gastrointestinal tract, and higher cortical centers. Several neurotransmitters, including serotonin, dopamine, histamine, and acetylcholine, play important roles in mediating nausea and vomiting (6. During spinal anesthesia, sympathetic blockades may result in hypotension and alterations in autonomic function, which can stimulate emetic pathways. Furthermore, the intrathecal administration of opioids and other perioperative factors such as prolonged surgical duration, patient positioning, and fluid imbalance may further increase the risk of PONV (6).

Several patient-related, anesthesia-related, and surgery-related factors have been identified as predictors of postoperative nausea and vomiting. Female gender, younger age, previous history of motion sickness or PONV, perioperative opioid use, and intraoperative hypotension are among the most frequently reported risk factors (7). In addition, longer surgical procedures and increased tissue manipulation have been associated with a greater likelihood of developing PONV. These factors emphasize the importance of identifying high-risk patients and implementing appropriate preventive measures to minimize postoperative complications and improve patient outcomes (8). Despite the clinical significance of PONV, limited local data are available regarding its incidence among patients undergoing elective urological surgery under spinal anesthesia (9). Therefore, this study was conducted to determine the incidence of postoperative nausea and vomiting in patients undergoing elective urological surgery under spinal anesthesia and to identify patient-related risk factors, particularly age and gender, associated with its occurrence (10). The findings of this study may contribute to the development of effective preventive strategies and enhance the quality of perioperative care.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in the Department of Urology at the Institute of Kidney Diseases (IKD), Peshawar, over a period of 4–6 months to determine the incidence of postoperative nausea and vomiting (PONV) among patients undergoing elective urological surgery under spinal anesthesia. A total of 165 patients were included in the study, with the sample size calculated using the formula $n = Z^2p(1-p)/E^2$. Participants were recruited through a non-probability convenience sampling technique. Eligible participants were adults aged 18–60 years undergoing elective urological procedures, including transurethral resection of the prostate (TURP), bladder tumor resection, and urethral surgery under spinal anesthesia. Only patients classified as American Society of Anesthesiologists (ASA) physical status I or II and willing to provide written informed consent were included. Patients undergoing emergency surgery, those requiring conversion from spinal to general anesthesia, individuals with a history of motion sickness or previous postoperative nausea and

vomiting, patients who received preoperative antiemetic medications, those with gastrointestinal disorders, and patients with known allergies to spinal anesthetic agents or unwillingness to participate were excluded from the study. Data were collected using a structured questionnaire that recorded demographic characteristics, medical history, type and duration of surgery, and the occurrence of postoperative nausea and vomiting. Spinal anesthesia was administered according to standard institutional protocols. All participants were monitored intraoperatively and for 24 hours postoperatively for the development of nausea and vomiting. Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics, including frequencies and percentages, were used to determine the incidence of PONV, while cross-tabulation was performed to assess its association with selected demographic variables such as age and gender.

RESULT

The descriptive data of the participants' ages. The analysis includes 165 respondents, with 0% missing data. The participants' average age was 40.71 years, with a standard deviation of 14.46 years, showing moderate age distribution within the study group.

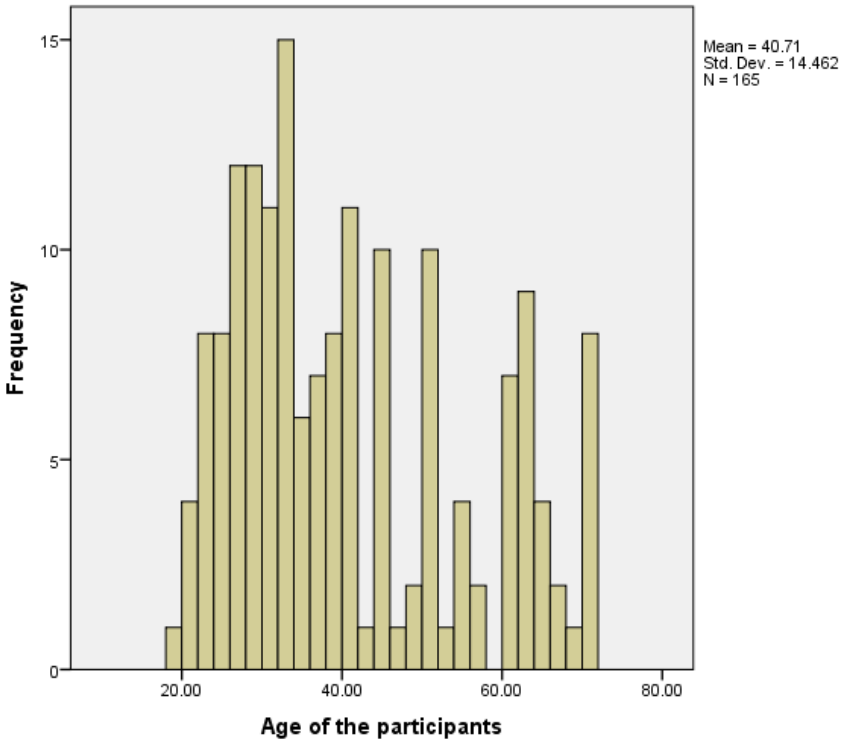

Figure 3.1: Age of the participants

Figure 4.1 illustrates the gender distribution of the participants. Out of 165 responses, 121 (73.3%) were male and 44 (26.7%) were female, showing that men made up the vast majority of the research participants. (Figure 4.1)

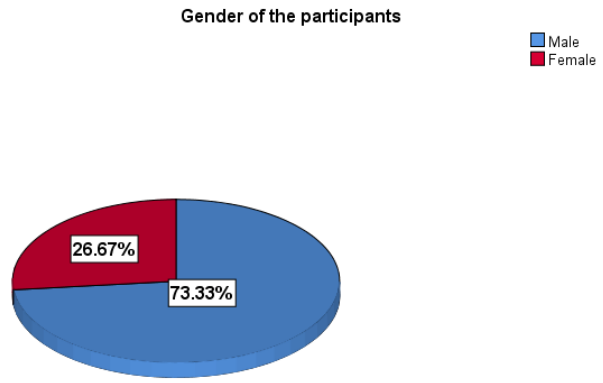

Fig No. 4. 1 Gender of the participants:

Figure No. 4.2 above depicts the distribution of participants based on ASA physical status. Out of 165 respondents, 115 (69.7%) were classed as ASA I, with 50 (30.3%) classified as ASA II, showing that the bulk of the participants were in the ASA I group.

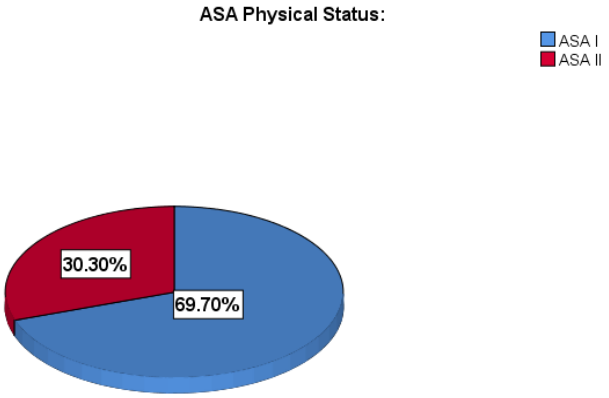

Fig No. 4. 2 ASA Physical Status:

As shown in Figure 4.3, among the 165 participants included in the study, 82 (49.7%) reported a history of smoking, while 83 (50.3%) reported no smoking history. These findings demonstrate a nearly balanced distribution of smokers and non-smokers among the respondents.

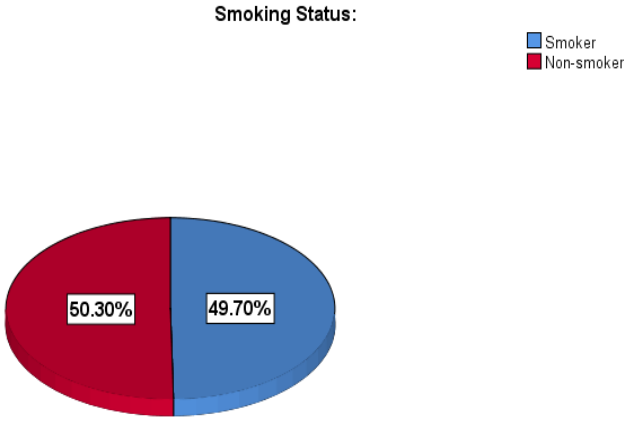

Fig No. 4. 3 Smoking Status:

Figure 4.4 presents the distribution of participants according to their history of motion sickness. Among the 165 respondents, 39 (23.6%) had a positive history of motion sickness, whereas 126 (76.4%) had no such history. The results reveal that a substantial majority of the study participants were not affected by motion sickness.

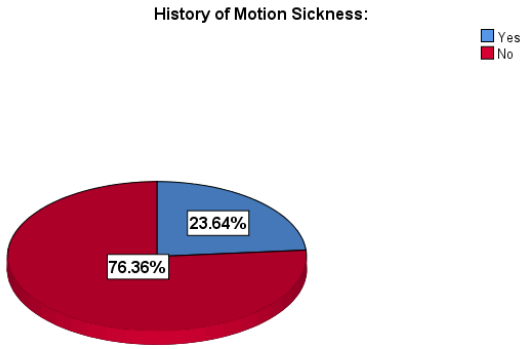

Fig No. 4. 4 History of Motion Sickness:

Figure 4.5 displays the subjects' past history of postoperative nausea and vomiting. Out of 165 respondents, 69 (41.8%) reported a previous history of postoperative nausea and vomiting, while 96 (58.2%) reported no such history, showing that the majority of participants did not have a prior history of postoperative nausea and vomiting.

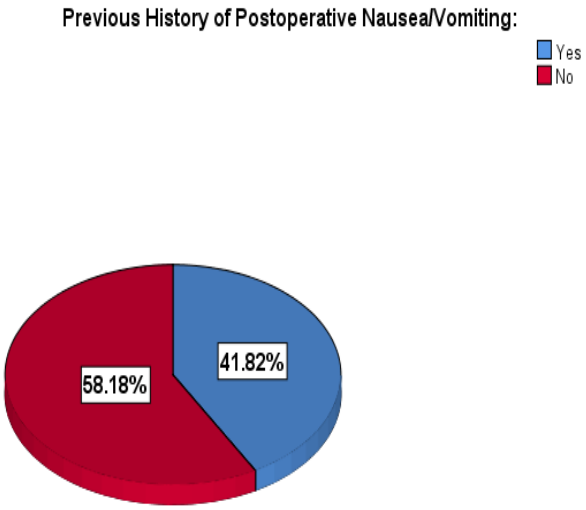

Fig No. 4. 5 Previous History of Postoperative Nausea/Vomiting;

Figure 4.6 displays the individuals' history of gastrointestinal illness. Out of 165 respondents, 68 (41.2%) reported having a history of gastrointestinal disease, whereas 97 (58.8%) reported no such history, indicating that the majority of participants did not had any GI disease.

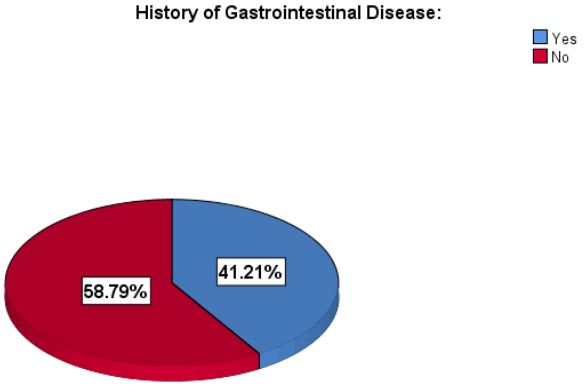

Fig No. 4. 6 History of Gastrointestinal Disease:

Figure 4.7 illustrates the distribution of participants based on the type of operation. Among the 165 responders, 39 (23.6%) received TURP, 9 (5.5%) got bladder tumor excision, and 11 (6.7%) underwent urethral surgery. The majority of participants, 106 (64.2%), were classified as "other" surgical procedures, which included 63 (38.2%) URS , 4 (2.4%) bladder stone procedure, 1 (0.6%) DJS case, 2 (1.2%) bilateral stenting procedure, and the remaining cases as CU procedures, indicating a wide range of surgical interventions within this group.

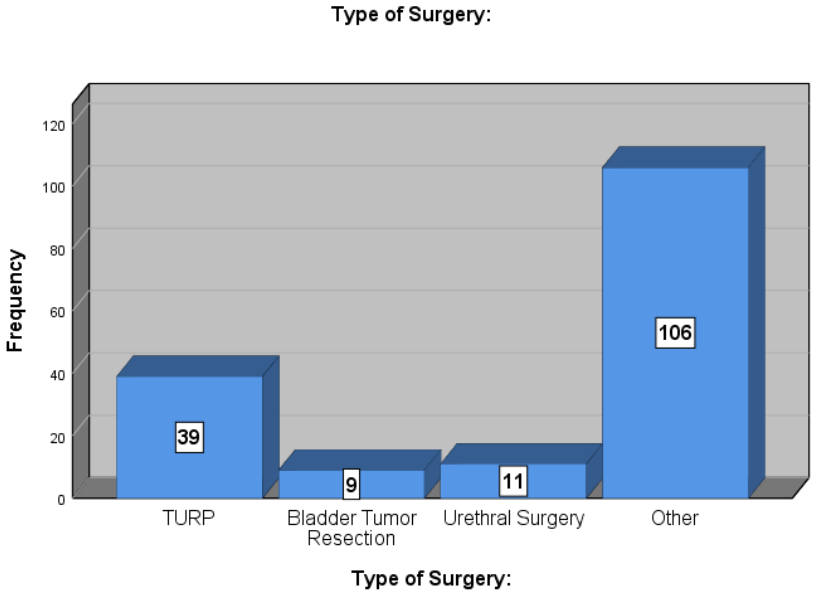

Fig No. 4. 7 Type of Surgery:

Figure 4.8 above depicts the distribution of participants based on the duration of operation. Out of 165 responders, 100 (60.6%) had surgery for less than an hour, 49 (29.7%) for 1-2 hours, and 16 (9.7%) for more than 2 hours, demonstrating that the majority of operations were brief.

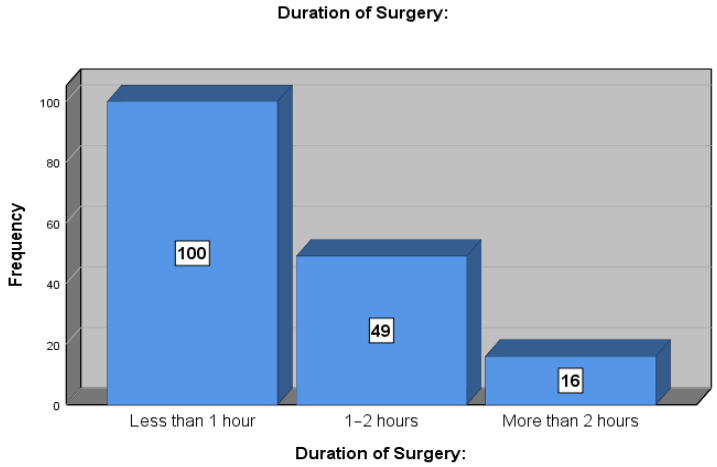

Fig No. 4. 8 Duration of Surgery:

Figure No. 4.9 above depicts if the patients experienced nausea. Out of 165 responders, 63 (38.2%) felt nausea, whereas 102 (61.8%) reported no nausea, indicating that the majority of patients did not feel nauseated.

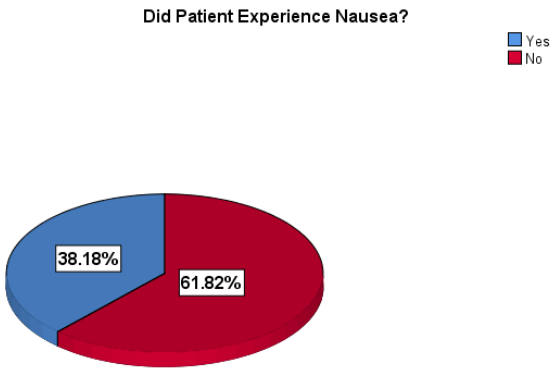

Fig No. 4. 9 Did Patient Experience Nausea?

The degree of nausea among individuals who reported feeling nausea in the preceding question. Out of 165 respondents, 64 said yes, whereas 101 (61.2%) did not experience nausea and hence did not react to the question. Among the 64 valid responses, 38 (23.0%; 59.4%) reported mild nausea, 17 (10.3%; 26.6%) reported moderate nausea, and 9 (5.5%; 14.1%) reported severe nausea, indicating that the majority of nausea cases were mild as mentioned below in Table No. 4.1

Table 4.1 Severity of Postoperative Nausea and Vomiting (PONV) Among Affected Patients

Severity	Frequency (n)	Percentage (%)
Mild	38	59.4
Moderate	17	26.6
Severe	9	14.1
Total	64	100.0

Figure No. 4.10 above depicts if the patients vomited. Out of 165 respondents, 83 (50.3%) reported vomiting and 82 (49.7%) reported no vomiting, showing a nearly similar distribution of patients who did and did not experience vomiting, with a slightly greater proportion reporting vomiting.

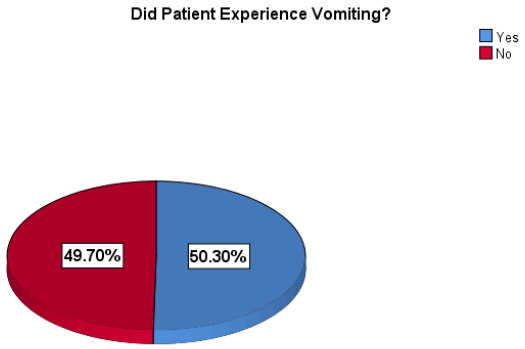

Fig No. 4. 10 Did Patient Experience Vomiting?

The number of vomiting episodes among the patients who reported vomiting in the preceding question. Out of the 165 respondents, 83 were valid for this item, whereas 82 (49.7%) were system-missing since they did not report vomiting and hence did not reply to this question. Among the 83 valid responses, 31 (18.8%) had one episode of vomiting, 44 (26.7%) had 2-3 episodes, and 8 (4.8%) had more than 3 episodes, implying that the majority of patients had 2-3 episodes of vomiting as mentioned below in Table No 4.2

Table 4.2: Number of PONV Episodes Among Affected Patients

Number of Episodes	Frequency (n)	Percentage (%)
One Episode	31	37.3
2–3 Episodes	44	53.0
More than 3 Episodes	8	9.6
Total	83	100.0

The timing of commencement of vomiting among patients who reported vomiting in the preceding question. Out of the 165 respondents, 83 were valid for this item, whereas 82 (49.7%) were system-missing since they did not report vomiting and hence did not reply to this question. Among the 83 valid replies, 45 (27.3%) reported vomiting for 0-2 hours, while 38 (23.0%) reported vomiting between 2-6 hours, showing that the majority of instances of vomiting occurred within the first 2 hours after surgery as mentioned below in Table No. 4.3

Table 4.3: Time of Onset of Postoperative Nausea and Vomiting (PONV) Among Affected Patients

Time of Onset	Frequency (n)	Percentage (%)
0–2 Hours	45	54.2
2–6 Hours	38	45.8
Total	83	100.0

Figure 4.11 above depicts whether rescue anti-emetics were necessary among the patients. Out of 165 responders, 84 (50.9%) required rescue anti-emetics, while 81 (49.1%) did not, demonstrating a nearly similar distribution of patients who needed and did not need rescue anti-emetics, with a slightly greater proportion requiring treatment.

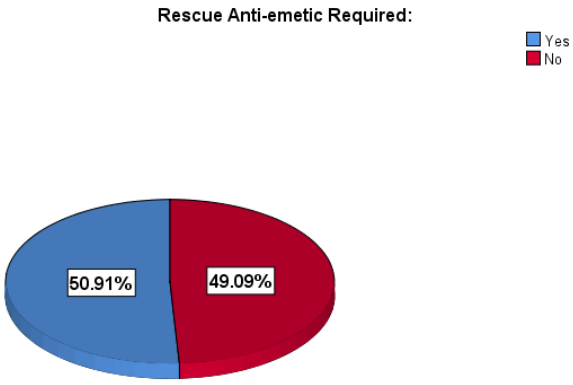

Fig No. 4. 11 Rescue Anti-emetic Required:

DISCUSSION

Ju et al. (2023), from Seoul, Korea, presented retrospective research in the Korean Journal of Anesthesiology on postoperative nausea and vomiting following spinal anesthesia in orthopedic surgery patients. The research comprised 5,691 patients, of whom 1,298 (22.8%) reported postoperative nausea and vomiting within 24 hours following spinal anesthesia. In terms of smoking status, the study found that nonsmokers had a considerably greater incidence of postoperative nausea and vomiting than smokers, with nonsmokers accounting for a higher proportion of patients reporting PONV. Similarly, in our study the smoking status of individuals. Out of 165 respondents, 82 (49.7%) smoked and 83 (50.3%) did not smoke, showing a roughly equal proportion of smokers and nonsmokers 4in the study population. (29)

Ju et al. (2023), Seoul, Korea, reported in their retrospective study that out of 5,691 patients undergoing spinal anesthesia, 1,298 (22.8%) developed postoperative nausea and vomiting within 24 hours. Among the analyzed predictors, previous history of postoperative nausea and vomiting was significantly associated with recurrence of PONV, with patients having a prior history showing a higher frequency of PONV occurrence compared to those without such history. Similarly, in our study subjects past history of postoperative nausea and vomiting. Out of 165 respondents, 69 (41.8%) reported a previous history of postoperative nausea and vomiting, while 96 (58.2%) reported no such history, showing that the majority of participants did not have a prior history of postoperative nausea and vomiting. (30)

Ahmed et al., International Journal of Surgery Open, 2020, did research on 355 surgical patients and found that 58 (16.3%) had a history of motion sickness, whereas the remainder had none. The total incidence of postoperative nausea and vomiting in their research was 17.2% (61 out of 355 patients), with 294 (82.8%) patients clear of these problems within 24 hours following surgery. Furthermore, their findings revealed that a history of motion sickness was substantially connected

with the development of postoperative nausea and vomiting, with individuals with this history having a much greater risk of developing PONV than those without. While in our study the subjects' history of motion sickness. Out of 165 respondents, 39 (23.6%) reported having a history of motion sickness, whereas 126 (76.4%) reported no such history, showing that the majority of participants did not suffer from motion sickness (30)

In a thorough evaluation of multivariable risk factor studies, Gan et al. (2006) found that postoperative vomiting occurred in diverse groups at varied frequency. In the research included in the review, Cohen et al. (1994) found vomiting in 17% of patients within 72 hours following surgery. Similarly, Koivuranta et al. (1997) found that 5% of patients vomited within 0-2 hours, 24% within 2-24 hours, and 25% within 24 hours. Furthermore, Apfel et al. (1998) observed a 21.5% vomiting incidence within 24 hours, while another research by Apfel et al. (1998) found that 25.5% of patients suffered postoperative vomiting within 24 hours. While in our study Out of 165 respondents, 83 (50.3%) reported vomiting and 82 (49.7%) reported no vomiting, showing a nearly similar distribution of patients who did and did not experience vomiting, with a slightly greater proportion reporting vomiting. (31)

In a comprehensive multivariable analytic evaluation, Koivuranta et al. (2006) found that postoperative vomiting episodes changed within the first 24 hours based on the surgical time interval. The study found that vomiting occurred in 5% of patients during the first 0-2 hours, whereas 24% of patients experienced vomiting between 2 and 24 hours, adding to a total vomiting incidence of almost 25% within 24 hours following surgery. These data show that postoperative vomiting is not only time-dependent but can occur in several episodes throughout the early postoperative period, indicating patient severity and frequency variability. Similarly, in our study the number of vomiting episodes among the patients who reported vomiting in the preceding question. Out of the 165 respondents, 83 were valid for this item, whereas 82 (49.7%) were system-missing since they did not report vomiting and hence did not reply to this question. Among the 83 valid responses, 31 (18.8% of total; 37.3% of valid responses) had one episode of vomiting, 44 (26.7% of total; 53.0% of valid responses) had 2-3 episodes, and 8 (4.8% of total; 9.6% of valid responses) had more than 3 episodes, implying that the majority of patients had 2-3 episodes of vomiting (32)

CONCLUSION

The purpose of this study was to identify the incidence and patterns of postoperative nausea and vomiting (PONV) in patients receiving elective urological surgery under spinal anesthesia. The data revealed that PONV is still a common postoperative complication in this patient population, with a significant percentage of patients reporting nausea and vomiting. Most patients who suffered vomiting reported 2-3 bouts, with the majority of incidents occurring within the first 2 hours after surgery, indicating an early onset trend. The majority of patients had minor nausea, but a significant number required rescue anti-emetic medication, demonstrating the therapeutic importance of PONV even under spinal anesthesia. Overall, the study shows that PONV is a common and early postoperative complication in urological surgery patients, underlining the importance of effective preventative techniques, early detection, and timely care to enhance postoperative patient comfort and outcomes.

RECOMMENDATIONS

Routine preoperative assessment of PONV risk factors should be performed in patients undergoing elective urological surgery under spinal anesthesia. High-risk patients should receive prophylactic antiemetic therapy, and close monitoring should be ensured during the early postoperative period, particularly within the first few hours after surgery. The use of multimodal antiemetic strategies and effective postoperative care protocols is recommended to reduce the incidence and severity of PONV. Further large-scale studies are needed to identify additional risk

factors and optimize preventive measures in this patient population.

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