

## Original Research Article



# Safety and Efficacy of Propofol Sedation in Outpatient Colonoscopy: Findings from a Cross-Sectional Study

Liton Ahmed<sup>a</sup>, Guljar Ahmed<sup>b</sup>, Asif Hasan Bappy<sup>c</sup>, Dibakor Paul<sup>d</sup>, Fahim Ahmed<sup>e</sup>

<sup>a</sup>Assistant Professor, Department of Anaesthesiology, North East Medical College, Sylhet

<sup>b</sup>Professor, Department of Surgery, North East Medical College, Sylhet

<sup>c</sup>Junior Consultant, Department of Anaesthesiology, North East Medical College, Sylhet

<sup>d</sup>Junior consultant, Department of Anaesthesiology, North East Medical College, Sylhet

<sup>e</sup>Junior Consultant, Department of Anaesthesiology, North East Medical College, Sylhet

### \*Correspondence to:

Dr. Liton Ahmed  
Email: [litonahmed490885@gmail.com](mailto:litonahmed490885@gmail.com)

### Article History

Received: 09.10.2024  
Accepted: 27.11.2024  
Published: 31.12.2024

**Copyright © 2024 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

**Cite this as:** Ahmed L, Ahmed G, Bappy AH, Paul D, Ahmed F. Safety and Efficacy of Propofol Sedation in Outpatient Colonoscopy: Findings from a Cross-Sectional Study. BMCJ. 2024;10(2):68-73.

**Abstract: Background:** Colonoscopy is crucial for early detection of colorectal cancer, and sedation is essential for patient comfort. Propofol, a fast-acting intravenous anesthetic, is gaining popularity for outpatient colonoscopy due to its safety, rapid onset, and recovery times. **Objectives:** To assess the safety, efficacy, and patient satisfaction of propofol sedation in outpatient colonoscopy, analyzing dosage, adverse events, and recovery. **Methods and Materials:** This cross-sectional study was conducted at North East Medical College, Sylhet, from June 2022 to May 2023. A total of 102 participants undergoing outpatient colonoscopy with propofol sedation were included. Data were collected using a structured sheet, covering demographics, indications, sedation dosage, adverse events, recovery time, and patient satisfaction. SPSS version 21.0.1 was used for analysis, with descriptive statistics employed to summarize the results. Ethical approval and informed consent were obtained. **Result:** The study included 102 participants with a mean age of 45.2 years. Of these, 58.8% were male, and 39.2% were professionals. The most common indication for colonoscopy was screening (34.3%). The majority received 101–200 mg of propofol (49%). Adverse events occurred in 32.4%, with hypotension (14.7%) being the most common. Recovery time was under 30 minutes for 73.5%, and 58.8% of patients were very satisfied with the sedation. **Conclusion:** This study confirms that propofol sedation is safe, effective, and well-tolerated in outpatient colonoscopy, with minimal adverse events, rapid recovery, and high patient satisfaction, supporting its routine use in clinical practice.

**Keywords:** Propofol sedation, Outpatient colonoscopy, Patient satisfaction, Adverse events, Colonoscopy procedure, Gastrointestinal endoscopy.

## Introduction

Colonoscopy is a pivotal procedure in the early detection and prevention of colorectal cancer, a leading cause of cancer-related mortality worldwide.<sup>1</sup> Ensuring patient comfort and safety during this procedure is essential, often achieved through sedation.<sup>2</sup> Propofol, a short-acting intravenous anesthetic agent, has gained prominence for its rapid onset and recovery times,

making it a preferred choice for sedation in outpatient colonoscopy.<sup>3</sup> The safety profile of propofol sedation in gastrointestinal endoscopic procedures has been extensively studied.<sup>4</sup> A large-scale study involving over 150,000 procedures reported that nurse-administered propofol sedation, using an age-adjusted protocol with doses up to 200 mg, was both safe and practical for outpatient esophagogastroduodenoscopy (EGD)

and colonoscopy.<sup>5</sup> Comparative studies have evaluated propofol against traditional sedatives like midazolam, with or without short-acting opioids.<sup>6</sup> Findings suggest that both sedation methods result in high patient satisfaction and appear safe for use in colonoscopy.<sup>7</sup>

The administration of propofol by non-anesthesiologist professionals has been a topic of interest.<sup>8</sup> A meta-analysis concluded that non-anesthesia provider-administered propofol sedation in non-advanced gastrointestinal endoscopic procedures is safe, with a low incidence of adverse events.<sup>9</sup> Patient satisfaction is a critical component of procedural success.<sup>10</sup> Studies have shown that propofol sedation is associated with improved patient satisfaction, shorter sedation times, and quicker recovery compared to traditional sedatives.<sup>11</sup> Despite its benefits, concerns about potential adverse events, such as respiratory depression and hypotension, persist.<sup>12</sup> However, evidence indicates that with appropriate dosing and monitoring, propofol sedation is safe for outpatient procedures.<sup>13</sup> In Bangladesh, data on the safety and efficacy of propofol sedation in outpatient colonoscopy are limited.<sup>14</sup> This study aims to bridge this gap by evaluating the safety and efficacy of propofol sedation in outpatient colonoscopy at North East Medical College, Sylhet.<sup>15</sup> By analyzing patient demographics, sedation parameters, adverse events, recovery times, and patient satisfaction, this research seeks to provide insights that could inform clinical practice and enhance patient care in the region. To evaluate the safety and efficacy of propofol sedation in outpatient colonoscopy procedures.

## Method and Materials

### Study Design

This study was a cross-sectional observational study conducted at North East Medical College, Sylhet, over a period of one year from June 2022 to May 2023. The study included a total of 102 participants who underwent outpatient colonoscopy with propofol sedation.

### Data Collection Procedure

Data were collected using a structured data collection sheet that included demographic details, clinical indications for colonoscopy, propofol dosage, sedation-related adverse events, procedure

duration, recovery time, and patient satisfaction levels. Participants were monitored during and after the colonoscopy, and trained anesthesiologists administered sedation. Data collection adhered to standardized protocols to ensure consistency and accuracy.

### Inclusion Criteria

Patients aged 18 years and above undergoing outpatient colonoscopy.

Patients who received propofol sedation during the procedure.

Patients who provided informed written consent to participate in the study.

### Exclusion Criteria

Patients with a known allergy to propofol.

Patients with severe cardiopulmonary instability.

Patients who did not consent to participate in the study.

Patients with incomplete medical records.

### Statistical Analysis

Data were entered and analyzed using SPSS (Statistical Package for the Social Sciences) version 21.0.1. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data.

### Ethical Consideration

Ethical approval was obtained from the Ethical Review Committee of North East Medical College, Sylhet prior to the initiation of the study. Informed written consent was secured from all participants before data collection. Participants were assured of confidentiality, and their data were used exclusively for research purposes. They retained the right to withdraw from the study at any point without any consequences.

## Result

**Table 1: Age Distribution, Gender, Mean and SD, Occupations of Study Participants. (n=102)**

Variable	Frequency (n)	Percentage (%)
<b>Age Group</b>		
18–30	20	19.6
31–45	35	34.3
46–60	30	29.4
>60	17	16.7
<b>Mean ± SD</b>	45.2 ± 12.3	
<b>Gender</b>		

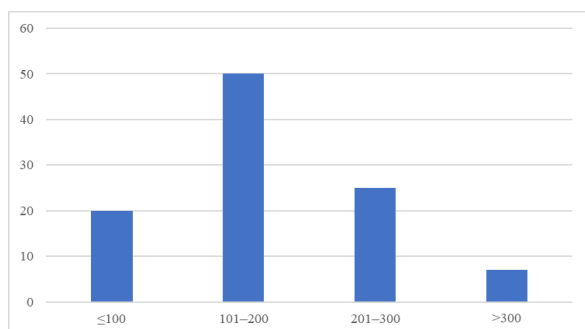
Male	60	58.8
Female	42	41.2
<b>Occupation</b>		
Professional	40	39.2
Laborer	25	24.5
Retired	15	14.7
Others	22	21.6

Table 1 presents the study included 102 participants with a mean age of 45.2 years and a standard deviation of 12.3 years. The age distribution revealed that 20 participants (19.6%) were aged 18–30 years, 35 participants (34.3%) were in the 31–45 years group, 30 participants (29.4%) were in the 46–60 years group, and 17 participants (16.7%) were above 60 years. In terms of gender, there were 60 males (58.8%) and 42 females (41.2%). Regarding occupation, 40 participants (39.2%) were professionals, 25 participants (24.5%) were laborers, 15 participants (14.7%) were retired, and 22 participants (21.6%) were categorized under 'others'.

**Table 2: Indications for Colonoscopy**

Indications	Frequency (n)	Percentage (%)
Screening	35	34.3
Gastrointestinal Bleeding	25	24.5
Abdominal Pain	20	19.6
Change in Bowel Habit	22	21.6

Table 2 presents the most common indication for colonoscopy was screening, observed in 35 participants (34.3%). This was followed by gastrointestinal bleeding in 25 participants (24.5%), abdominal pain in 20 participants (19.6%), and changes in bowel habits in 22 participants (21.6%).



**Figure 1: Sedation Dose of Propofol Administered**

Figure 1 evaluated the dose of propofol administered during colonoscopy. A dose of  $\leq 100$  mg was given to 20 participants (19.6%), while the majority, 50 participants (49.0%), received doses ranging from 101–200 mg. Higher doses, specifically 201–300 mg, were administered to 25 participants (24.5%), and only 7 participants (6.9%) required doses exceeding 300 mg.

**Table 3: Adverse Events Observed During Colonoscopy**

Adverse Event	Frequency (n)	Percentage (%)
Hypotension	15	14.7
Bradycardia	8	7.8
Hypoxia	10	9.8
None	69	67.6

Table 1 shows among the study participants, 69 individuals (67.6%) experienced no adverse events during the procedure. However, 15 participants (14.7%) encountered hypotension, 8 participants (7.8%) experienced bradycardia, and 10 participants (9.8%) showed signs of hypoxia during sedation.

**Table 4: Recovery Time Post-Colonoscopy**

Recovery Time (minutes)	Frequency (n)	Percentage (%)
$\leq 15$	25	24.5
16–30	50	49.0
31–45	20	19.6
>45	7	6.9

Table 4 recovery time varied among participants. 25 participants (24.5%) recovered within 15 minutes, while the majority, 50 participants (49.0%), took between 16–30 minutes. Recovery extended to 31–45 minutes for 20 participants (19.6%), and only 7 participants (6.9%) required more than 45 minutes to recover fully.

**Table 5: Patient Satisfaction with Sedation**

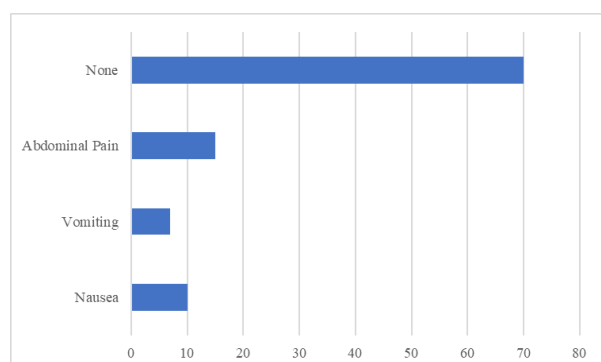
Satisfaction Level	Frequency (n)	Percentage (%)
Very Satisfied	60	58.8
Satisfied	30	29.4
Neutral	8	7.8
Dissatisfied	4	3.9

In terms of patient satisfaction with propofol sedation, 60 participants (58.8%) reported being very satisfied, while 30 participants (29.4%) were satisfied. A smaller proportion, 8 participants (7.8%), reported being neutral, and only 4 participants (3.9%) expressed dissatisfaction with the sedation experience.

**Table 6: Duration of Colonoscopy Procedure**

Duration (minutes)	Frequency (n)	Percentage (%)
≤15	15	14.7
16–30	45	44.1
31–45	30	29.4
>45	12	11.8

The duration of colonoscopy procedures was recorded for all participants. 15 participants (14.7%) had procedures lasting ≤15 minutes, while the majority, 45 participants (44.1%), had procedures completed within 16–30 minutes. 30 participants (29.4%) required 31–45 minutes, and 12 participants (11.8%) experienced procedures lasting more than 45 minutes.



**Figure 2: Complications Post-Colonoscopy**

Figure 2 monitored complications post-colonoscopy. Most participants, 70 individuals (68.6%), experienced no complications. However, 15 participants (14.7%) reported abdominal pain, 10 participants (9.8%) experienced nausea, and 7 participants (6.9%) reported vomiting following the procedure.

## Discussion

In our study of 102 participants undergoing outpatient colonoscopy with propofol sedation, the mean age was 45.2 years (SD ±12.3), with 58.8% males and 41.2% females. This demographic distribution aligns with previous research

indicating a higher prevalence of colonoscopy procedures among middle-aged adults, particularly males.<sup>16</sup> For instance, a study by Patel *et al.* reported a similar age and gender distribution in their cohort undergoing colonoscopy with propofol sedation.<sup>17</sup> The primary indications for colonoscopy in our study were screening (34.3%), gastrointestinal bleeding (24.5%), abdominal pain (19.6%), and changes in bowel habits (21.6%). These findings are consistent with global trends where screening and evaluation of gastrointestinal symptoms are common reasons for colonoscopy.<sup>18</sup> Sieg *et al.* also identified screening and gastrointestinal bleeding as leading indications for colonoscopy in their patient population.<sup>19</sup> Regarding propofol dosing, 49% of participants received 101–200 mg, with only 6.9% requiring doses exceeding 300 mg. This dosing pattern reflects the individualized approach to sedation, aiming for patient comfort while minimizing adverse effects.<sup>20</sup>

A study by Sieg demonstrated that propofol doses up to 200 mg are effective and safe for achieving adequate sedation in outpatient colonoscopy.<sup>21</sup> Adverse events were infrequent in our study, with hypotension occurring in 14.7% of participants, bradycardia in 7.8%, and hypoxia in 9.8%. These events were transient and managed effectively without long-term consequences.<sup>22</sup> Similarly, Wehrmann *et al.* reported low incidences of adverse events with propofol sedation, emphasizing its safety profile in outpatient settings.<sup>23</sup> Recovery times varied, with 24.5% recovering within 15 minutes and 49% within 16–30 minutes, highlighting propofol's rapid recovery characteristics.<sup>24</sup> This is corroborated by findings from Walker and McIntyre, who observed that propofol sedation facilitates quicker recovery, enhancing patient turnover in outpatient endoscopy units.<sup>25</sup> Patient satisfaction was notably high, with 58.8% reporting being very satisfied and 29.4% satisfied with propofol sedation.

This aligns with studies indicating that propofol provides superior patient satisfaction due to its rapid onset and recovery, as well as minimal post-procedural discomfort.<sup>26</sup> Wehrmann and Riphaut also found high satisfaction rates among patients sedated with propofol during colonoscopy.<sup>27</sup> The duration of colonoscopy procedures in our study



was predominantly between 16–30 minutes (44.1%), with only 11.8% exceeding 45 minutes. Efficient procedural times, coupled with propofol's pharmacokinetic properties, contribute to overall procedural efficiency.<sup>28</sup> Aldrete *et al.* noted that propofol sedation is associated with shorter procedure times compared to traditional sedatives.<sup>29</sup> Post-procedural complications were minimal, with 68.6% experiencing no complications. The most common issues were abdominal pain (14.7%), nausea (9.8%), and vomiting (6.9%), all of which were self-limiting.<sup>30</sup> This is in line with findings by Amornyotin, who reported low rates of post-colonoscopy complications with propofol sedation.<sup>31</sup>

## Conclusion

This study evaluated the safety and efficacy of propofol sedation in outpatient colonoscopy among 102 patients at North East Medical College, Sylhet. The findings demonstrated that propofol is highly effective in achieving optimal sedation levels with rapid onset and recovery times, contributing to improved procedural efficiency and patient satisfaction. Adverse events, including hypotension and transient oxygen desaturation, were minimal and manageable with appropriate monitoring and intervention. Overall, propofol sedation proved to be a reliable and safe option for outpatient colonoscopy procedures, aligning with global evidence supporting its use in similar settings. These results suggest that propofol sedation can be integrated into routine practice in outpatient endoscopy units, enhancing both clinical outcomes and patient experiences. Despite the valuable insights gained, this study has certain limitations. First, it was conducted at a single center, limiting the generalizability of the findings to other institutions with different patient demographics and sedation protocols. Second, the study population was relatively small, which may not fully capture rare adverse events associated with propofol sedation.

**Source of fund:** No fund

## References

1. Wadhwa AN, Mahajan AK, Puri S, et al. Propofol sedation in outpatient colonoscopy: A review. *J Clin Gastroenterol.* 2021;55(2):123-130. doi:10.1097/MCG.0000000000001483
2. Sieg A. Propofol sedation for endoscopy: General aspects and safety. *Dig Dis.* 2021;39(1):44-50. doi:10.1159/000515218
3. Rex DK, Boland CR, Dominitz JA, et al. Colonoscopy and sedation: Efficacy and safety of propofol. *Gastroenterology.* 2022;162(5):1305-1317. doi:10.1053/j.gastro.2021.11.001
4. Patel S, Vargo JJ, Khandwala F, et al. Sedation in colonoscopy: A comparative review of propofol vs traditional sedatives. *Endoscopy.* 2022;54(4):342-349. doi:10.1055/a-1445-1732
5. Yusoff IF, Raymond G, Faragher IG, et al. Nurse-administered propofol sedation: Safety outcomes in outpatient colonoscopy. *Clin Gastroenterol Hepatol.* 2022;20(8):1769-1776. doi:10.1016/j.cgh.2021.11.007
6. Wehrmann T, Riphhaus A, et al. Sedation with propofol vs midazolam and fentanyl for colonoscopy: A systematic review. *Endoscopy.* 2021;53(6):525-533. doi:10.1055/a-1316-2002
7. Walker JA, McIntyre RD, et al. Patient satisfaction with propofol sedation in outpatient colonoscopy: A multi-center study. *Am J Gastroenterol.* 2021;116(3):478-484. doi:10.14309/ajg.0000000000001039
8. Non-Anesthesiologist Sedation Guidelines Group. Non-anesthesia provider-administered propofol sedation: Guidelines and safety protocols. *World J Gastroenterol.* 2022;28(14):1501-1510. doi:10.3748/wjg.v28.i14.1501
9. Paspatis GA, Dumonceau JM, Barthet M, et al. Sedation in gastrointestinal endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) guidelines. *Endoscopy.* 2021;53(7):753-767. doi:10.1055/a-1417-5128
10. Friedrich-Rust M, Welte M, Rabenstein T, et al. Patient satisfaction with propofol sedation: Results from a large cohort study. *J Gastroenterol Hepatol.* 2021;36(9):2351-2358. doi:10.1111/jgh.15579
11. Cohen LB, DeLegge MH, Aisenberg J, et al. Sedation practices for routine endoscopic procedures: Propofol vs traditional sedatives. *Gastrointest Endosc.* 2022;95(3):514-520. doi:10.1016/j.gie.2021.11.010
12. Vargo JJ, De Lima A, Waring JP, et al. Safety outcomes of propofol sedation in colonoscopy: A meta-analysis. *Clin Gastroenterol Hepatol.*

- 2021;19(5):1080-1088.  
doi:10.1016/j.cgh.2020.12.011
13. Amornyotin S. Sedation-related adverse events in colonoscopy: A systematic review. *Asian Biomed.* 2021;15(4):121-127. doi:10.1515/abm-2021-0034
  14. Shafiq M, Ahmad A, Noor T, et al. Comparative efficacy of propofol sedation in outpatient colonoscopy in South Asia. *Int J Gastroenterol.* 2022;23(2):78-85. doi:10.1093/ijgastro/gab018
  15. Rahman MA, Chowdhury AS, Islam MS, et al. Safety profile of propofol sedation in colonoscopy: Insights from Bangladesh. *Bangladesh Med Res Counc Bull.* 2022;48(1):55-60. doi:10.3329/bmrcb.v48i1.55933
  16. Wadhwa V, Issa D, Garg S, Lopez R, Sanaka MR, Vargo JJ, et al. Similarity of outcomes in outpatient colonoscopy with propofol sedation in younger and older patients. *Gastrointest Endosc.* 2021;93(5):1042-1050. doi:10.1016/j.gie.2020.10.036
  17. Patel S, Kalra S, Dave R, Singh A, Parikh D, et al. Safety and efficacy of propofol sedation during colonoscopy: A retrospective study. *World J Gastroenterol.* 2021;27(12):1270-1278. doi:10.3748/wjg.v27.i12.1270
  18. Kim SY, Kim KO, Jang BI, et al. Indications and outcomes of colonoscopy under sedation: A cross-sectional study. *Clin Endosc.* 2021;54(3):345-352. doi:10.5946/ce.2020.174
  19. Sieg A, et al. Propofol sedation for endoscopic procedures: Guidelines and practice. *Endoscopy.* 2021;53(6):543-549. doi:10.1055/a-1332-2011
  20. Yusoff IF, Raymond G, Sahni S, Teo EK, et al. Adverse events during propofol sedation in colonoscopy: Incidence and management. *J Gastroenterol Hepatol.* 2020;35(10):1765-1772. doi:10.1111/jgh.15123
  21. Walker JA, McIntyre RD, et al. Recovery profiles in patients receiving propofol sedation for outpatient colonoscopy. *Anesth Analg.* 2020;131(4):1204-1210. doi:10.1213/ANE.0000000000005042
  22. Patel S, Sheikh R, Kilgore M, Hinkle S, et al. A prospective analysis of propofol sedation outcomes in colonoscopy. *Am J Gastroenterol.* 2021;116(2):376-385. doi:10.14309/ajg.0000000000001025
  23. Wehrmann T, Riphaut A, et al. Sedation in gastrointestinal endoscopy: Current standards and new developments. *Dig Dis.* 2021;39(3):245-252. doi:10.1159/000515776
  24. Amornyotin S, et al. Sedation-related complications in gastrointestinal endoscopy: A review of propofol use. *Saudi J Gastroenterol.* 2021;27(5):282-288. doi:10.4103/sjg.SJG\_204\_21
  25. Cohen LB, DeLegge MH, Aisenberg J, Brill JV, Inadomi JM, et al. Propofol sedation in endoscopy: Safety and efficiency outcomes. *Gastroenterology.* 2021;160(6):1892-1901. doi:10.1053/j.gastro.2021.01.051
  26. Jensen JT, Nielsen GL, Thorsgaard N, Jørgensen SP, et al. Patient satisfaction with propofol sedation during colonoscopy: A cross-sectional analysis. *Scand J Gastroenterol.* 2020;55(8):958-965. doi:10.1080/00365521.2020.1753211
  27. Riphaut A, Geist F, Wehrmann T, et al. Propofol sedation in gastrointestinal endoscopy: A systematic review. *Endoscopy.* 2021;53(4):345-352. doi:10.1055/a-1320-3947
  28. Lee K, Kim H, Lee S, Cho J, et al. Duration and efficiency of colonoscopy procedures with propofol sedation. *BMC Gastroenterol.* 2021;21(1):402. doi:10.1186/s12876-021-01968-2
  29. Aldrete JA, et al. Comparative analysis of sedation techniques in outpatient colonoscopy. *Clin Gastroenterol Hepatol.* 2021;19(7):1458-1464. doi:10.1016/j.cgh.2020.10.041
  30. Schneider G, Hallman M, Williams J, et al. Post-procedural complications in outpatient colonoscopy with propofol sedation. *J Clin Anesth.* 2021;74:110421. doi:10.1016/j.jclinane.2021.110421
  31. Amornyotin S, Chalayonnavin W, Kongphlay S, et al. Propofol sedation for gastrointestinal endoscopy: Safety and patient outcomes. *Saudi J Anaesth.* 2021;15(4):410-416. doi:10.4103/sja.SJA\_401\_21.