

Anxiolytic Efficacy of Midazolam Premedication Among Surgical Patients: A Clinical Evaluation from Routine Practice

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ABSTRACT

Background: Midazolam is a short-acting benzodiazepine that is commonly used as a premedication due to its anxiolytic, sedative, and amnesic effects. This study aimed to assess the anxiolytic effect and perioperative safety of midazolam premedication in surgical patients. **Methods & Materials:** This descriptive observational study was carried out in the Department of Anaesthesiology & ICU, International Medical College Hospital, Gazipur, Bangladesh, from January 2025 to December 2025, on 130 patients who were undergoing elective or semi-emergency surgery and were given midazolam as part of their routine anesthetic care. Sociodemographic characteristics, clinical and surgical profile, premedication characteristics, change in anxiety level, and perioperative outcomes were recorded and analyzed descriptively. **Results:** Most patients were in the age group of 31-50 years (67.7%), and there was almost equal distribution of males and females. Of the 69.2% who had moderate to severe anxiety before premedication, the primary concerns were fear of postoperative pain and anesthesia. Oral midazolam (63.1%) at a dose of 0.04-0.05 mg/kg (55.4%) was most frequently used and resulted in a calm and cooperative response in 80.0% of patients. Minimal anxiety increased from 9.2% to 52.3% after premedication, and 80.8% of patients had a satisfactory anxiolytic response. Hemodynamic stability was achieved in 91.5% of patients, and there was a low incidence of nausea/vomiting (5.4%) and paradoxical agitation (3.1%). **Conclusion:** Midazolam premedication was found to be an effective and safe anxiolytic in routine clinical practice in surgical patients, and is therefore recommended as a useful premedication in tertiary care centers.

Keywords: Midazolam; Preoperative anxiety; Premedication; Anxiolysis

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INTRODUCTION

Preoperative anxiety is one of the most common psychological problems faced in surgical practice, and it is seen in a significant number of patients regardless of the nature or size of the surgery to be performed^[1]. It is defined as a state of tension, apprehension, and increased autonomic arousal that occurs when a person is anticipating surgery and anesthesia^[2]. The prevalence of preoperative anxiety has been reported to be very different across the world, but a pooled analysis of low- and middle-income countries indicates that over 50% of all surgical candidates have clinically significant preoperative anxiety^[2]. Similar trends have been reported for the Chinese and Ethiopian surgical populations, with younger age, female sex, lower education, and first exposure to surgery being consistently associated with increased preoperative distress^[3, 6]. The same concerns, focused on pain after surgery, the side effects of anesthesia, and the uncertainty about the surgery's results, have been reported as the most prevalent concerns in a variety of cultural contexts^[4]. Preoperative anxiety is a clinical issue that needs to be addressed. It has been associated with unstable hemodynamics at induction, increased anesthetic requirements, delayed

recovery and decreased patient satisfaction with the overall surgical experience^[7]. Pharmacological premedication remains the primary approach for anxiolysis before elective and semi-emergency procedures in resource-limited environments like Bangladesh, where preoperative counseling services and dedicated anxiety-screening protocols are not routinely available^[5]. Of the different premedication agents available, midazolam, a short-acting benzodiazepine that acts on the gamma-aminobutyric acid type A receptor complex, is the most commonly used because of its rapid onset and its anxiolytic, sedative, and anterograde amnesic effects^[8, 10]. It may be given orally or intravenously, and studies on premedication suggest that its effectiveness and tolerability depend on dose, timing before induction, and route of administration^[10, 11]. Preoperative counseling has also been investigated as an adjunct or alternative to pharmacologic anxiolysis to decrease anticipatory fear before major procedures^[9]. Although midazolam is used routinely in various surgical specialties, there is a lack of real-world evidence from tertiary care hospitals in Bangladesh that shows how the dosing of midazolam, baseline anxiety profile, and sociodemographic factors relate to actual anxiolytic effects and perioperative safety in

clinical practice. The majority of data available are from randomized, placebo-controlled trials performed in high-income countries and may not adequately represent the diversity of patients and administration practices in the real world of anesthesia care^[8]. Hence, this study was conducted to assess the anxiolytic effect, clinical response, and perioperative safety of midazolam premedication in surgical patients in a routine clinical setting in a tertiary care hospital.

METHODS & MATERIALS

This descriptive observational study was carried out in the Department of Anaesthesiology & ICU, International Medical College Hospital, Gazipur, Bangladesh, from January 2025 to December 2025. Patients were enrolled consecutively after informed written consent and comprised 130 patients undergoing elective or semi-emergency surgery under general or spinal/regional anesthesia who received midazolam as part of routine anesthetic care. Patients were included if their ASA physical status was I, II, or III and were willing to participate. Patients with a known allergy or contraindication to benzodiazepines, pre-existing psychiatric or cognitive disorders, chronic use of sedatives or anxiolytics,

severe cardiopulmonary compromise, emergency surgery precluding adequate premedication time, or inability to communicate or complete the anxiety assessment were excluded. The variables studied included sociodemographic characteristics (age, sex, residence, educational status, occupation), clinical and surgical profile (type and nature of surgery, ASA status, planned anesthesia, previous anesthesia exposure, comorbidities), baseline preoperative anxiety profile (anxiety level, source of anxiety, sleep quality, preoperative counseling, prior anxiolytic use), midazolam premedication characteristics (route, dose, timing before anesthesia, immediate clinical response, need for reassurance), change in anxiety level before and after premedication, and

perioperative outcomes and safety parameters (sedation status, cooperation, hemodynamic stability, nausea or vomiting, paradoxical agitation, and recall of the preoperative period). The magnitude of anxiolytic response was assessed clinically by a structured categorical scale before and after premedication. A pre-designed and pretested structured questionnaire was used to collect data, which were recorded on a standard data collection sheet at the time of the pre-operative assessment, premedication, and perioperative period by the attending anesthesia team. All the data collected were checked for completeness and internal consistency and entered into the SPSS software (version 26) for analysis. Categorical variables were summarized using descriptive statistics, and frequencies

and percentages were presented in tabular form for interpretation.

RESULTS

The sociodemographic profile of the 130 study patients is shown in *Table I*. Most patients (35.4%) were aged 41-50 years, followed by 31-40 years (32.3%). The sex ratio was almost equal, with a slight female predominance (50.8%). The sample consisted of 55.4% urban residents. In terms of education, 33.8% had secondary level education and 22.3% were graduates or above. The largest occupational group was housewives (33.8%), followed by service holders (23.1%) and business persons (15.4%).

Table I

Sociodemographic characteristics of the study patients.

Variable	Category	n (%)
Age group	≤30 years	18 (13.8%)
	31-40 years	42 (32.3%)
	41-50 years	46 (35.4%)
	>50 years	24 (18.5%)
Sex	Male	64 (49.2%)
	Female	66 (50.8%)
Residence	Urban	72 (55.4%)
	Rural	58 (44.6%)
Educational status	No formal education / Primary	26 (20.0%)
	Secondary	44 (33.8%)
	Higher secondary	31 (23.8%)
	Graduate or above	29 (22.3%)
Occupation	Housewife	44 (33.8%)
	Service holder	30 (23.1%)
	Business	20 (15.4%)
	Student	12 (9.2%)
	Others	24 (18.5%)

Table II shows the clinical and surgical profile of the patients. General surgery (37.7%) and orthopedic surgery (21.5%) were the most common procedures, followed by gynecological/obstetric surgery

(20.0%). The majority of surgeries were elective (86.2%), and 54.6% of patients were ASA physical status I. General anesthesia was planned for 63.1% of patients. 44.6% of the patients had been

exposed to anesthesia before, and 67.7% had no known comorbidity, with hypertension (13.8%) and diabetes mellitus (9.2%) being the most common comorbid conditions.

Table II

Clinical and surgical profile of the study patients.

Variable	Category	n (%)
Type of surgery	General surgery	49 (37.7%)
	Orthopedic surgery	28 (21.5%)
	Gynecological / Obstetric surgery	26 (20.0%)
	Urological surgery	15 (11.5%)
	ENT surgery	12 (9.2%)
Nature of surgery	Elective	112 (86.2%)
	Semi-emergency	18 (13.8%)
ASA physical status	ASA I	71 (54.6%)
	ASA II	51 (39.2%)
	ASA III	8 (6.2%)
Planned anesthesia	General anesthesia	82 (63.1%)
	Spinal / Regional anesthesia	48 (36.9%)
Previous anesthesia exposure	Yes	58 (44.6%)
	No	72 (55.4%)
Comorbidity status	No known comorbidity	88 (67.7%)
	Hypertension	18 (13.8%)
	Diabetes mellitus	12 (9.2%)
	Asthma / COPD	7 (5.4%)
	Others	5 (3.8%)

The baseline preoperative anxiety profile before premedication is shown in *Table III*. The most frequent anxiety level was moderate (47.7%), severe (21.5%), and mild (21.5%), with only 9.2% reporting minimal anxiety. The most common causes of anxiety were fear of postoperative pain (33.8%) and fear of anesthesia (30.0%). 60.0% of patients reported disturbed sleep the previous night. 58.5% of patients had received preoperative counseling, and 10.8% had previously taken an anxiolytic or sedative drug.

Table III
Baseline preoperative anxiety profile before midazolam premedication.

Variable	Category	n (%)
Baseline anxiety level	Minimal anxiety	12 (9.2%)
	Mild anxiety	28 (21.5%)
	Moderate anxiety	62 (47.7%)
	Severe anxiety	28 (21.5%)
Main source of anxiety	Fear of postoperative pain	44 (33.8%)
	Fear of anesthesia	39 (30.0%)
	Fear of surgical outcome	27 (20.8%)
	Family separation / financial concern	20 (15.4%)
Sleep on the previous night	Adequate sleep	52 (40.0%)
	Disturbed sleep	78 (60.0%)
Preoperative counseling received	Yes	76 (58.5%)
	No	54 (41.5%)
Previous use of an anxiolytic/sedative drug	Yes	14 (10.8%)
	No	116 (89.2%)

Characteristics of premedication with midazolam are summarized in *Table IV*. The oral route was the most common (63.1%), and 55.4% of patients received a dose of 0.04-0.05 mg/kg, with the most common time of premedication being 30-45 minutes before anesthesia (53.8%). 80.0% of patients were calm and cooperative immediately after administration, 16.2% were drowsy but easily aroused, and 3.8% were excessively sedated. In 24.6% of patients, further reassurance was needed.

Table IV
Midazolam premedication-related characteristics.

Variable	Category	n (%)
Route of midazolam administration	Oral	82 (63.1%)
	Intravenous	48 (36.9%)
Dose of midazolam	<0.04 mg/kg	18 (13.8%)
	0.04-0.05 mg/kg	72 (55.4%)
	>0.05 mg/kg	40 (30.8%)
Timing before anesthesia	30-45 minutes before anesthesia	70 (53.8%)
	46-60 minutes before anesthesia	42 (32.3%)
	>60 minutes before anesthesia	18 (13.8%)
Immediate clinical response	Calm and cooperative	104 (80.0%)
	Drowsy but easily arousable	21 (16.2%)
	Excessive sedation	5 (3.8%)
Need for additional reassurance	Yes	32 (24.6%)
	No	98 (75.4%)

Table V shows the difference in anxiety levels before and after the premedication with midazolam. The proportion of participants with minimal anxiety increased from 9.2% to 52.3% after premedication, whereas the proportion with severe anxiety decreased from 21.5% to 2.3% after premedication. Overall, 80.8% of patients had a satisfactory anxiolytic response, 14.6% had a partial response, and 4.6% had a poor response, with no satisfactory responses at baseline.

Table V
Change in anxiety level after midazolam premedication.

Variable	Category	Before premedication, n (%)	After premedication, n (%)
Anxiety level	Minimal anxiety	12 (9.2%)	68 (52.3%)
	Mild anxiety	28 (21.5%)	38 (29.2%)
	Moderate anxiety	62 (47.7%)	21 (16.2%)
	Severe anxiety	28 (21.5%)	3 (2.3%)
Overall anxiolytic response	Satisfactory response	0 (0.0%)	105 (80.8%)
	Partial response	0 (0.0%)	19 (14.6%)
	Poor response	0 (0.0%)	6 (4.6%)

- Minimal anxiety - Relaxed or slightly worried, cooperative, no visible distress
 - Mild anxiety - Mild fear or nervousness, but remains cooperative
 - Moderate anxiety - Clearly anxious or restless, needs reassurance
- Severe anxiety - Very fearful, restless, poorly cooperative, or difficult to reassure

Perioperative outcomes and safety after premedication are summarized in *Table VI*. Before anesthesia, most patients were mildly drowsy (46.9%) or awake and calm (33.8%), and 75.4% were cooperative during transfer. Hemodynamic status was

stable in 91.5% of patients. Nausea or vomiting was seen in 5.4% and paradoxical agitation in 3.1%. When asked about the recall of the preoperative period, 56.9% had no recall, 23.1% had partial recall, and 20.0% had clear recall.

Table VI
Perioperative outcomes and safety profile after midazolam premedication.

Variable	Category	n (%)
Sedation status before anesthesia	Awake and calm	44 (33.8%)
	Mildly drowsy	61 (46.9%)
	Moderately sedated but arousable	20 (15.4%)
	Excessively sedated	5 (3.8%)
Cooperation during preoperative transfer	Good	98 (75.4%)
	Fair	24 (18.5%)
	Poor	8 (6.2%)
Hemodynamic status	Stable	119 (91.5%)
	Transient hypotension	7 (5.4%)
	Transient oxygen desaturation	4 (3.1%)
Nausea or vomiting	Yes	7 (5.4%)
	No	123 (94.6%)
Paradoxical agitation	Yes	4 (3.1%)
	No	126 (96.9%)
Recall of the preoperative period	No recall	74 (56.9%)
	Partial recall	30 (23.1%)
	Clear recall	26 (20.0%)

DISCUSSION

The age distribution of the majority of patients in this study was 31-50 years, and the sex distribution was almost equal, which demonstrates that patients with preoperative anxiety span a wide age range and are not limited to a specific group^[12]. This urban overrepresentation and the secondary school education level have also been reported before, and a lower education level has been linked to increased anxiety due to inadequate knowledge of anesthesia and surgical procedures^[13]. The most common procedures in this study were general surgery and orthopedic surgery, and most of these were elective and ASA I-II, similar to the case-mix usually encountered in low- and middle-income countries' tertiary surgical units, where most procedures are elective and performed on relatively fit patients^[12]. Premedication, before surgery, revealed that almost 70% of the patients had moderate to severe anxiety, with fear of postoperative pain and fear of anesthesia being the most common causes. This is consistent with Li et al., who showed that fear of surgical outcome and anesthesia-related concerns were the main factors contributing to perioperative anxiety, especially for first-time surgical candidates^[15]. Our study shows that disturbed sleep on the night before surgery was also prevalent, consistent with Li et al., who found that a poor night's sleep before surgery is associated with increased anxiety^[15]. Although over half of patients received some preoperative counselling, moderate to

severe anxiety was common, and this is similar to the findings of trials that have demonstrated inconsistent results in the use of counselling alone without anxiolytic medication^[13]. The majority of patients were administered the oral route of midazolam at a dose of 0.04-0.05 mg/kg, most of whom received it 30-45 minutes before induction, and the majority of patients responded to the drug with a calm and cooperative response, with only a small proportion requiring further reassurance. This is similar to the dose-ranging study by Woldegerima et al., which showed that moderate doses of midazolam provided adequate anxiolysis without undue sedation^[14]. Similar clinical response patterns have been observed after oral midazolam premedication in adult outpatients undergoing procedures under general anesthesia, where oral midazolam resulted in reliable sedative and anxiolytic effects with an acceptable safety margin^[21]. The significant decrease in anxiety severity after premedication, the dramatic increase in the number of cases with minimal anxiety, and the high percentage of satisfactory anxiolytic response support the proven anxiolytic effect of midazolam in structured clinical trials^[16, 17]. Notably, this benefit was not associated with significant hemodynamic compromise, with the vast majority of patients being hemodynamically stable, consistent with the evidence of the relatively favorable cardiovascular safety profile of midazolam^[16]. The rates of adverse events in our study were found to be

low, consistent with Grant et al., who reported that intravenous midazolam is more likely to decrease postoperative nausea and vomiting than to provoke it^[20]. The high percentage of patients with partial or complete memory loss for the preoperative period is consistent with the well-known anterograde amnesic effect of midazolam, which has also been shown to improve overall patient satisfaction with premedication in comparative trials^[21, 18]. Together, these results confirm the utility, efficacy, and generally good tolerability of midazolam as an anxiolytic premedication in clinical practice and underscore the importance of counseling deficits and dosing variability in the residual effects of preoperative anxiety experienced by a clinically relevant minority of patients^[13, 15]. These observations are consistent with those from studies conducted in adult outpatient settings, as well as large multicenter surveys, which further validate the generalizability of midazolam's anxiolytic and safety profile beyond the controlled environment of a randomized trial and justify its continued use in routine premedication practices in tertiary care centers like ours^[19, 14].

LIMITATIONS

This study was conducted in a single center and did not include a placebo or comparator group; anxiety was measured on a structured categorical scale, not a standardized validated instrument like the State-Trait Anxiety Inventory.

CONCLUSION

This study demonstrated that midazolam premedication was effective in decreasing the preoperative anxiety of surgical patients under routine clinical conditions, and most of the patients shifted from moderate to severe anxiety to minimal anxiety after receiving the drug. The clinical response was calm and cooperative in most patients when given orally 30-45 minutes before anesthesia at a dose of 0.04-0.05 mg/kg. The premedication was well tolerated, with hemodynamic stability maintained in the vast majority of patients and low rates of nausea, vomiting, and paradoxical agitation. Partial or complete amnesia for the preoperative period was also seen in a high proportion of patients, which is characteristic of the anterograde amnesic effect of midazolam. The results support the use of midazolam as a safe, effective, and convenient anxiolytic premedication in routine surgical anesthesia. Further optimization of anxiolytic outcomes may be achieved by continued attention to individualized dosing and preoperative counseling.

RECOMMENDATIONS

Further multicenter studies with anxiety scales and randomized comparison of different doses and routes of midazolam are recommended to optimize premedication protocols in routine surgical practice.

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