

EVALUATION OF EFFICACY OF INTRANASAL MIDAZOLAM SPRAY FOR PREANAESTHETIC MEDICATION IN PAEDIATRIC PATIENTS

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ABSTRACT: BACKGROUND: Preoperative anxiety and long-term behavioural problems are inevitable consequences in absence of preoperative sedation in paediatric patients undergoing surgery. An ideal premedicant removes fear and anxiety in tender minds of children and achieves a calm, sedated child for smooth induction of anaesthesia and rapid recovery in postoperative period. Midazolam is the most commonly used premedicant in children as it satisfies most of the criteria of ideal premedicant but its route of administration is a debatable issue in anaesthesia practice. **AIMS:** This study evaluated the efficacy of atomized intranasal midazolam spray as a painless, user-friendly, needleless system of drug administration for pre-anaesthetic medication in paediatric patients. **SETTINGS AND DESIGN:** Tertiary hospital, a prospective, randomized, controlled, clinical study. **METHODS AND MATERIAL:** 60 ASA physical status I children of 2-5 years age group, weighing 10-18 kg scheduled for routine surgeries participated in the study. Children were randomly assigned to Group M: Received intranasal midazolam spray in doses of 0.2 mg/kg and Group N: Received normal saline drops (1-2 drops/nostril). Patients were observed in preoperative room for 20 min. Acceptance of drug, response to drug administration, sedation scale, separation score, acceptance to mask, recovery score and side effects of drug were noted. **STATISTICAL ANALYSIS:** Student 't' test, standard error of difference between two means and Chi-square test. p value < 0.05 was considered as statistically significant. **RESULTS AND CONCLUSION:** 35% children in group M and 42.10% children in group N cried after drug administration who were not crying before drug administration (p > 0.05). 20 min after premedication 76.66% in group M and 10.00% group N, children showed satisfactory sedation (p < 0.05). 73.33% in group M while 26.66% in group N, children showed acceptable parental separation and 86.66% in group M while 23.33% group N, children showed satisfactory acceptance to mask (p < 0.05). Transient nasal irritation in the form of rubbing of nose, watering, sneezing and lacrimation was observed in 40% children of group M.

Intranasal midazolam by atomized spray is safe and effective premedicant in paediatric patients. It produces effective sedation and anxiolysis in children. Transient nasal irritation is an undesirable side effect observed with intranasal route.

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KEY WORDS: atomized intranasal midazolam spray, pre-anaesthetic medication, children

Hospitalization, surgical operations and anaesthesia induction can be acutely traumatic to a child and may lead to lasting emotional and behavioural problems [1,2]. Considering the psychology of separation, they are at risk of developing parental separation syndrome which is a psychological trauma, accompanied with crying, yelling, struggling, and nightmares [3]. Preoperative anxiety occurring in upto 60% young children of 2-5 years of age is associated with unstable intraoperative vitals and a more painful recovery [4,5,6]. Both behavioral interventions (e.g. parental presence) and pharmacological interventions (e.g. sedative premedicants) are used to treat anxiety before surgery. Attending anaesthesiologists are better than mother in predicting the anxiety of children during induction of anesthesia [7,8].

Pharmacological intervention before surgery was found to be more effective intervention than either parental presence or no premedication-no parent present for managing a child's and parent's anxiety during the preoperative period [9]. Benzodiazepines, particularly Midazolam comes nearest to the ideal anxiolytic with minimal side effects [10,11]. Midazolam has been used for preoperative sedation by intramuscular [12], intravenous [13], rectal [14], oral [15,16], sublingual [17,18], and intranasal [19, 20] routes. But each route has its own advantages and disadvantages.

Intranasal midazolam administration, a convenient way to premedicate children has got rapid and reliable onset of action [21]. Midazolam in the form of drops, spray and nebulization is tried by nasal route [22,23,24]. Delivery by drops results in poor retention and drainage into the post-nasal space [22]. A higher dose may need to be administered for adequate pre-anaesthetic medication when midazolam is given by nebulizer [24].

There are very few studies which used concentrated, atomized nasal spray, a good technique and slow and careful spraying of drug which solved the problem of volume and effective dose availability [20,25,26]. So the present study was carried out to evaluate the efficacy of intranasal midazolam by using atomizer spray for pre-anaesthetic medication in paediatric patients undergoing surgical procedures.

MATERIALS AND METHODS: After obtaining Institutional Ethical Committee approval, a pilot study was conducted on 10 children from each group (Group M- receiving intranasal midazolam by atomizer spray and Group N- receiving intranasal normal saline drops) to determine the sample size. A sample size of 4 was adequate to allow 80% power to detect a difference of 15% between the two groups, outcome parameter considered was sedation score [27]. We selected a larger group of 30 children in each group.

60 ASA grade I paediatric patients of age group 2-5 years, weighing 10-18 kg, scheduled for elective surgical procedures requiring general anaesthesia with expected duration not exceeding 75 min were included in the study. Elective surgeries lasting upto 75 min were selected as terminal half-life of intranasal midazolam is about 79 ± 30 mins [25]. Patients having nasal infection or nasal pathology, those allergic to midazolam, those taking any other sedative drug, those having any facial malformation, airway difficulty or history of snoring, any systemic illness and parents not willing to allow their child to participate in the study were excluded from the study. These children were divided into two groups of 30 each by systematic randomization, every even number patient received intranasal Midazolam spray and every odd number patient received Normal saline.

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Thorough pre-anaesthetic evaluation and investigations were carried out to find out any associated systemic illness. All children were fasted 4-6 hours before surgery. None of the children received any medication before arrival in the operating room. Child was then taken in preoperative room along with one of the parents for administration of intranasal midazolam spray or normal saline. Written informed consent in parent's language regarding voluntary participation of their child in the clinical drug trial was obtained.

On arrival in the preoperative room baseline pulse rate, respiratory rate, blood pressure and arterial oxygen saturation were recorded. Children were randomly allocated in one of the two groups.

Group M patients received intranasal midazolam spray 0.2 mg/kg ^[20] (each spray delivered 0.1ml or 0.5 mg of drug, preparation containing midazolam 5 mg/ml with a maximum dose of 10 mg). Half of the dose was administered in each nostril. The child was placed on the parent's lap while their arms were gently restrained by one parental hand and the other hand used to tilt the forehead back 15°. Child was put in a comfortable position either lying down or sitting, after drug administration. Group N patients received normal saline nasal drops in both the nostrils, 1-2 drops/nosril.

Acceptance of drug was observed by using 3 point criteria as poor (score 1- Refused to accept medication), moderate (score 2- Accepted medication with difficulty), or good (score 3- Accepted medication without complaint) ^[28]. Response to drug administration was noted as whether the child was crying previously or whether the child started crying after administration of drug. Children crying before administration of drug were excluded for observation of response to drug administration.

After administration of drug pulse rate, respiratory rate, blood pressure, Sp_o₂, and state of sedation were recorded at 5 min interval for 20 min. According to various studies time required for peak effect of intranasal midazolam is 20 min ^[18, 25]. Sedation score 1 (Agitated) and 2 (Alert) were considered as unsatisfactory, while sedation score 3 (Calm), 4 (Drowsy), and 5 (Asleep) were considered as satisfactory ^[29]. Complications like nasal irritation, coughing, sneezing, lacrimation, hypoxia, laryngospasm, bradycardia, nausea, vomiting if any, were noted and treated by administering oxygen by face mask if arterial saturation dropped below 90% and Inj. Atropine for heart rate <60/min as needed.

After 20 min of drug administration child was separated from the parents ^[18, 25]. Ease of separation from the parent was noted as excellent (Score 1- Patient unafraid, co-operative), good (Score 2- Slight fear or crying, quiet with assurance), fair (Score 3- Moderate fear, crying not quiet with assurance) and poor (Score 4- Crying, need for restraint) ^[30]. Separation score 1 and 2 were considered as satisfactory or acceptable and score of 3 and 4 were considered as unsatisfactory or said to have a difficult separation.

Vital parameters- pulse rate, blood pressure and Sp_o₂ were monitored. Inhalational induction was done with 50:50 nitrous oxide/oxygen and sevoflurane 6-8% by using face mask. Acceptance to mask (Reaction to gas induction) was noted by using 3 point criteria. Score 1 (excellent) and 2 (good) were considered as satisfactory and score 3 (poor) was considered as unsatisfactory acceptance of mask.

I.V. line was set up after induction and inj. Glycopyrrolate 4 µg/kg and Inj. Fentanyl 1µg/kg i.v. were administered. Intubation was done with endotracheal tube of appropriate size under the

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effect of inj. Scoline 2 mg/kg i.v. Anaesthesia was maintained with Sevoflurane 1.5-2% in 50:50 nitrous oxide / oxygen through Jackson Rees circuit and inj. Atracurium 0.5 mg/kg i.v. with its subsequent top-up doses as required. At the end of surgical procedure, patient was reversed with inj. Neostigmine 40 µg/kg and inj. Glycopyrrolate 8 µg/kg i.v. Extubation was performed when child was fully conscious, with stable vital parameters and could flex his thighs on the abdomen. Duration of anaesthesia was calculated from mask induction till extubation.

Children were observed in post anaesthesia care unit (PACU). Recovery assessment was done at 10 min interval for 30 min from the time of extubation by using a 10 point recovery room score. Multipara monitored SpO₂, respiratory rate and blood pressure whereas activity, patients color and level of consciousness was assessed clinically each on a scale of 0-2, to give a maximum total of 10 [29]. Satisfactory recovery i.e. recovery score of 8 or more and time taken for it were noted. Children were observed in PACU for 2 hrs and were then shifted to the ward when recovery score was ≥8. They were followed up for 24 hours post-operatively to observe nasal irritation, ulceration, etc.

Data were recorded in proforma and analysed statistically by using student 't' test, standard error of difference between two means and Chi-square test. The SPSS version model was used. p<0.05 was considered as statistically significant and p<0.01 was considered as highly significant.

RESULTS: Children of both the sexes were included in the study. Mean age for group A was 3.28±1.05 years and for group B was 3.43±1.023 years (Table 1). Mean weight for group M was 12.46±1.99 kg and group N was 13.26±2.34 kg. Duration of anaesthesia ranged from 30-75 min (mean 57±14.05) for group M and 25-75 min (mean 51.66±13.66) for group N. Both the groups were comparable as far as age, sex, weight and duration of anaesthesia is concerned (p>0.05).

There were no significant differences in pre-sedation vital parameters (Table 2) and baseline sedation score (p>0.05). Baseline sedation score ranged from 1-2 in all children of both the groups.

15/30 children from Group M and 11/30 children from Group N showed good acceptance to drug (Figure 1). 10 children from group M and 11 children from group N were crying before drug administration, so response to drug administration was difficult to assess and were excluded for this observation. Response to drug administration was evaluated as whether non-crying child had cried or not after drug administration. 07 from group M and 08 from group N non-crying children, cried after drug administration (Figure 1). No statistically significant difference was found between Group M and Group N (p>0.05).

7/30 (23.33%) children from group M and 27/30 (90.00%) children from group N had sedation score of 2 or less at 20 min and was considered as unacceptable sedation. 19/30 (63.33%) children from group M and 3/30 (10.00%) children from group N had sedation score of 3 at 20 min. 4/30 (13.33%) children from group M and 0/30 (0%) children from group N had sedation score of 4 at 20 min. Statistically significant difference was noted between both the groups at 10, 15 and 20 min (p<0.05). (Table 3, Figure 2)

Complications like hypoxia, bradycardia, laryngospasm, nausea and vomiting were not observed in both the groups. Incidence of nasal irritation was found to be 12/30 (40%) in group M and 4/30 (13.33%) in group N.

Post sedation vital parameters were noted over 20 min in both the groups (Table 4). A statistically significant difference was observed in respiratory rate, systolic blood pressure,

diastolic blood pressure and oxygen saturation at and after 10 min, and in pulse rate at and after 15 min, between the two groups ($p < 0.05$).

22/30 (73.33%) children from group M and 08/30 (26.66%) children from group N showed satisfactory separation (score 1, 2). 8/30 (26.66%) children from group M and 22/30 (73.33%) children from group N showed difficult separation (score 3, 4) (Table 5, Figure 2). 26/30 (86.66%) children from group M and 7/30 (23.33%) children from group N showed satisfactory acceptance to mask (Table 6, Figure 2).

Intraoperative pulse rate, systolic blood pressure, diastolic blood pressure and oxygen saturation was stable and comparable (Table 7). Recovery score at 10 min, 20 min, and 30 min was comparable in group M and group N ($p > 0.05$) (Table 8). Local effects like ulceration, mucosal redness were not observed in any of the patients.

DISCUSSION: Illness, hospitalization and especially surgical operations have significant emotional and psychological impact on the growing child and parents and those involved in the care of sick children have become increasingly aware of it [1]. The preschool children are least likely to cooperate with induction of anaesthesia and the most at risk to experience a negative psychological aftermath. We selected children in the age group of 2-5 years (Table 1) because children in this age group are at highest risk of separation anxiety due to their limited understanding [4, 19].

Infants and children are without significant apprehension or fear and that they can be quickly anaesthetized with an inhalation agent without prior sedation (or needle prick) is a fallacious and unreasonable concept [3]. The large quantity of literature published relating to premedication for children, is indicative that the search for the "ideal" agent has not yet yielded a universally satisfactory drug.

Across the world, midazolam is the most commonly used premedicant in paediatric patients [11]. Midazolam as a premedicant is administered to paediatric patients by various routes like intravenous, intramuscular, per rectal, sublingual, per oral, intranasal etc [13-15, 22, 24]. The fact that no single route has achieved universal acceptance suggests that each route has its own merits and demerits. Intravenous and intramuscular routes have disadvantage of painful injections which children dislike. Discomfort to child, unpredictable absorption, longer time to achieve desired effect and concerns about modesty are problems related with per rectal route. Compliance with instructions to hold the sublingual medication for defined duration in infants and preschool children is not guaranteed. Bitter taste, low systemic availability and delayed peak effect put limitation on oral route of midazolam [19, 31, 32].

Owing to high mucosal vascularity, intranasal route offers rapid and virtually complete absorption of the drug [19]. Midazolam by nasal route can be administered in the form of drops, spray or nebulization. There are very few studies which used concentrated, atomized nasal spray, a good technique and slow and careful spraying of drug which solved the problem of volume and effective dose availability [20, 25, 26]. Concentrated, atomized midazolam nasal spray, delivers the drug in puffs which contain very minute particles which spread over a large surface area. Atomised nasal spray ensures accurate drug dosage (0.5mg/0.1 ml), increasing the concentration of midazolam reduces the volume of drug to be delivered, drug is applied over wide area with close mucosal contact. The bioavailability of intranasal midazolam by using a concentrated nasal spray may reach up to 83% [25]. Intranasal atomized midazolam has been tried in the doses of 0.2, 0.3, and 0.4 mg/kg

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[20,23], but no additional was found from the higher dosage and recommended using the lower dose of midazolam 0.2 mg/kg [29].

In our study, acceptance of drug in group M was (50%) and group N was (36.67%). Response to drug administration was, 7 out of remaining 20 non crying children from group M, and 8 out of remaining 19 non crying children from group N, cried after drug administration. Difference in two groups was statistically insignificant. Though none of the child complained pain in our study, nasal discomfort might be there. Some children were temporarily distressed by the instillation of either midazolam or normal saline but rapidly settled down [29]. Intranasal midazolam by drops or spray produces unpleasant nasal irritation, the fine aerosol of spray would allow greater contact, seems to cause more nasal stinging than drops [22].

To assess sedation status a 3- point, 4- point or 5- point sedation scale was used by previous investigators [30,33,34]. We used a 5-point sedation scale to assess the degree of sedation. In our study, 23/30 (76.66%) children from group M and 3/30 (10.00%) children from group N had acceptable sedation (i.e. score 3 or more) at 20 min (Table 3, Figure 2). 4/30 (13.33%) children from group M and none from group N had sedation score of 4 at 20 min. None of children lost consciousness in either of the group. As far as level of sedation is concerned statistically significant difference was noted in both the groups at 10,15 and 20 min ($p<0.05$). From these observations, it appears that onset of sedation after intranasal midazolam is about 10 min [19]. Rapid uptake and high bioavailability of intranasal midazolam resulting into high plasma concentration at 14 ± 5 min is useful for rapid onset by intranasal midazolam spray [25].

In our study only nasal irritation / transient distress was observed and its incidence in group M was 12/30 (40%) and 4/30 (13.33%) in group N which was statistically significant. Incidence of nasal irritation and crying was 56% and 71% in other studies [17,36]. Lugo R.A et al [37] recommended spraying of 4% lidocaine spray prior to midazolam spray for reducing irritation without affecting efficacy of midazolam. Dallman J A et al [38] (2001) suggested use of midazolam solution in cyclodextrin, which results in greater concentration of the drug as well as less pH.

Anxiolysis was observed at parental separation and mask application by two different anxiolysis scales. In our study 22 (73.33%) children from group M and 8 (26.66%) children from group N showed satisfactory separation which was statistically significant ($p<0.05$). Parental separation was poor in group B (Table 5, Figure 2). Similar results were noted in other studies [19,35]. In our study 26 (86.66%) children from group M and 7 (23.33%) children from group N showed satisfactory acceptance to mask which was statistically significant ($p<0.05$) (Table 6, Figure 2). Comparable satisfactory mask application of 60%, 80% and 75% were observed in other studies [18,19,35].

In our study, intraoperative vitals (Table 7) and duration of anaesthesia were comparable in both the groups ($p>0.05$). While studying on intranasal midazolam Zedie et al observed that vital signs remained stable with medication during the study period [39].

In our study, recovery score for group M vs group N at 10 min, 20 min, and 30 min was comparable in both the groups ($p>0.05$) (Table 8). Our results were comparable with other studies [19,29]. They stated that, in oral route a significant amount of drug undergoes first pass metabolism, in contrast this is not seen with intranasal midazolam, so recovery is not delayed.

However, there are some limitations of our study.

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- The study could not be blinded as the parents used to tell the evaluator anaesthesiologist about administration of spray or drops even without asking them.
- Crying of the child after administration of the drug could be due to anxiety or nasal irritation that could not be differentiated.

As results with 0.2 mg/kg and 0.3 mg/kg intranasal midazolam spray are controversial, further study can be carried out comparing 0.2mg/kg with 0.3 mg/kg for intranasal route [23,29]. Measures to reduce irritation like use of 4% lidocaine spray [37] before midazolam spray and midazolam solution in cyclodextrin^[38] can be tried.

Thus, we conclude from the present study that intranasal midazolam atomiser spray is an effective sedative and anxiolytic pre-anaesthetic medication in children. Transient nasal irritation was the only side effect observed. So, Intranasal midazolam was not only effective premedicant but also safe for paediatric patients.

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TABLE 1: Showing age and sex distribution

Age (Years)	Number of children					
	Group M*		Group N**		Total	
	M No. of pts	F No. of pts.	M No. of pts	F No. of pts	M No. of pts	F No. of pts
2-3.5	15/30	03/30	10/30	07/30	25/30	10/30
3.6-5	8/30	04/30	10/30	03/30	18/30	07/30
Total	23/30	07/60	20/60	10/60	43/60	17/60

* Midazolam group

** Normal saline group

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TABLE 2: Showing pre-sedation vital parameters

Vital parameters	Group M (Mean± S.D)	Group N (Mean± S.D)
Pulse rate (per minute)	108.2±12.24	114.6±13.04
Respiratory rate (per minute)	23.60±2.69	23.46±2.62
Systolic blood pressure (mmHg)	96.6±5.66	96.2±6.20
Diastolic blood pressure (mmHg)	60.33±4.10	58.8±3.38
Arterial oxygen saturation (%)	98.96±1.06	98.56±0.81

TABLE 3: Showing sedation scale

Sedation score	Sedation scale at different intervals (No. of patients)									
	0 min		5 min		10 min*		15 min*		20 min*	
	M	N	M	N	M	N	M	N	M	N
1 (Agitated)	09	10	11	16	06	18	01	14	00	09
2 (Alert)	21	20	19	14	19	12	12	16	07	18
3 (Calm)	00	00	00	00	05	00	17	00	19	03
4 (Drowsy)	00	00	00	00	00	00	00	00	04	00
5 (Asleep)	00	00	00	00	00	00	00	00	00	00

* Statistically significant difference

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TABLE 4: Showing post sedation vital parameters

Time interval	Post sedation vital parameters									
	Mean (\pm S.D.)									
	PR(/min)		RR(/min)		SBP(mmHg)		DBP(mmHg)		Spo ₂ (%)	
	M	N	M	N	M	N	M	N	M	N
0 min	108.86 (\pm 12.56)	114.67 (\pm 13.08)	23.66 (\pm 2.46)	23.46 (\pm 2.62)	96.66 (\pm 5.99)	96.2 (\pm 6.20)	60.33 (\pm 4.10)	58.80 (\pm 3.38)	98.96 (\pm 1.06)	98.56 (\pm 0.81)
5 min	109.2 (\pm 13.09)	114.13 (\pm 14.89)	24.13 (\pm 2.72)	24.00 (\pm 1.82)	97.6 (\pm 5.13)	97.46 (\pm 5.50)	59.96 (\pm 4.49)	60.13 (\pm 3.23)	99.43 (\pm 0.81)	98.83 (\pm 0.98)
10 min \square	108.13 (\pm 14.63)	112.33 (\pm13.29)	23.26 (\pm2.75)	25.13 (\pm2.14)	96.03 (\pm5.68)	98.13 (\pm5.43)	59.73 (\pm5.11)	62.13 (\pm3.27)	99.36 (\pm0.85)	99.20 (\pm0.92)
15 min \square	105.4 (\pm12.10)	111.93 (\pm12.65)	22.6 (\pm2.23)	25.6 (\pm1.85)	95.4 (\pm5.73)	98.8 (\pm5.64)	58.13 (\pm5.70)	62.00 (\pm3.19)	98.86 (\pm1.04)	99.36 (\pm0.85)
20 min \square	103.93 (\pm11.22)	111.80 (\pm13.73)	22.46 (\pm2.27)	25.8 (\pm2.18)	95.26 (\pm5.95)	99.53 (\pm5.00)	58.66 (\pm4.07)	63.20 (\pm2.99)	98.73 (\pm0.98)	99.16 (\pm0.59)

\square Statistically significant difference

TABLE 5: Showing separation score

Score	Number of children		
	Group M	Group N	Total
1 (Excellent)	09/30	01/30	10/60
2 (Good)	13/30	07/30	20/60
3 (Fair)	07/30	14/30	21/60
4 (Poor)	01/30	08/30	09/60
Total	30	30	60

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TABLE 6: Showing acceptance to mask

Score	Number of children		
	Group M No. (%)	Group N No. (%)	Total No. (%)
1 (Excellent)	08 (26.66)	01 (3.33)	09 (15.00)
2 (Good)	18 (60.00)	06 (20.00)	24 (40.00)
3 (Poor)	04 (13.33)	23 (76.66)	27 (45.00)
Total	30	30	60

TABLE 7: Showing Intraoperative vital parameters

Time interval	Intraoperative vital parameters Mean (\pm S.D.)							
	PR (/min)		SBP (mmHg)		DBP (mmHg)		SPO2 (%)	
	A	B	A	B	A	B	A	B
5 min	105.00 (\pm 11.37)	108.53 (\pm 15.27)	95.8 (\pm 6.13)	94.6 (\pm 6.58)	59.6 (\pm 3.61)	58.4 (\pm 4.43)	99.23 (\pm 0.97)	99.2 (\pm 1.03)
10 min	108.00 (\pm 11.93)	113.26 (\pm 15.99)	96.66 (\pm 5.39)	95.6 (\pm 6.79)	60.33 (\pm 4.00)	58.93 (\pm 5.32)	99.16 (\pm 1.01)	99.26 (\pm 0.98)
15 min	108.86 (\pm 12.43)	113.33 (\pm 14.90)	95.6 (\pm 6.11)	96.0 (\pm 5.58)	58.73 (\pm 5.36)	58.33 (\pm 4.66)	99.23 (\pm 0.97)	99.33 (\pm 1.09)
30 min	106.33 (\pm 13.44)	111.24 (\pm 15.29)	95.36 (\pm 5.62)	95.17 (\pm 5.54)	58.53 (\pm 3.96)	57.93 (\pm 4.08)	99.2 (\pm 0.84)	99.27 (\pm 0.95)
45 min	107.41 (\pm 13.10)	112.83 (\pm 15.81)	95.41 (\pm 5.02)	95.90 (\pm 5.80)	58.58 (\pm 4.66)	58.36 (\pm 2.66)	99.2 (\pm 0.93)	99.27 (\pm 0.88)
60 min	105.44 (\pm 10.86)	111.28 (\pm 15.97)	95.27 (\pm 5.89)	96.14 (\pm 4.25)	58.77 (\pm 4.00)	58.0 (\pm 2.35)	99.11 (\pm 0.90)	99.21 (\pm 0.89)
75 min	108.50 (\pm 6.60)	108.00 (\pm 18.33)	93.0 (\pm 6.21)	94.66 (\pm 2.30)	60.0 (\pm 1.63)	58.0 (\pm 3.46)	99.0 (\pm 0.81)	99.0 (\pm 0.81)

TABLE 8: Showing Recovery score

Time interval	Recovery score	
	Group M Mean \pm S.D.	Group N Mean \pm S.D.
10 min	8.5 \pm 1.07	8.76 \pm 0.97
20 min	9.23 \pm 0.81	9.56 \pm 0.62
30 min	10 \pm 0	10 \pm 0

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FIGURE 1: Comparison between Group M and Group N

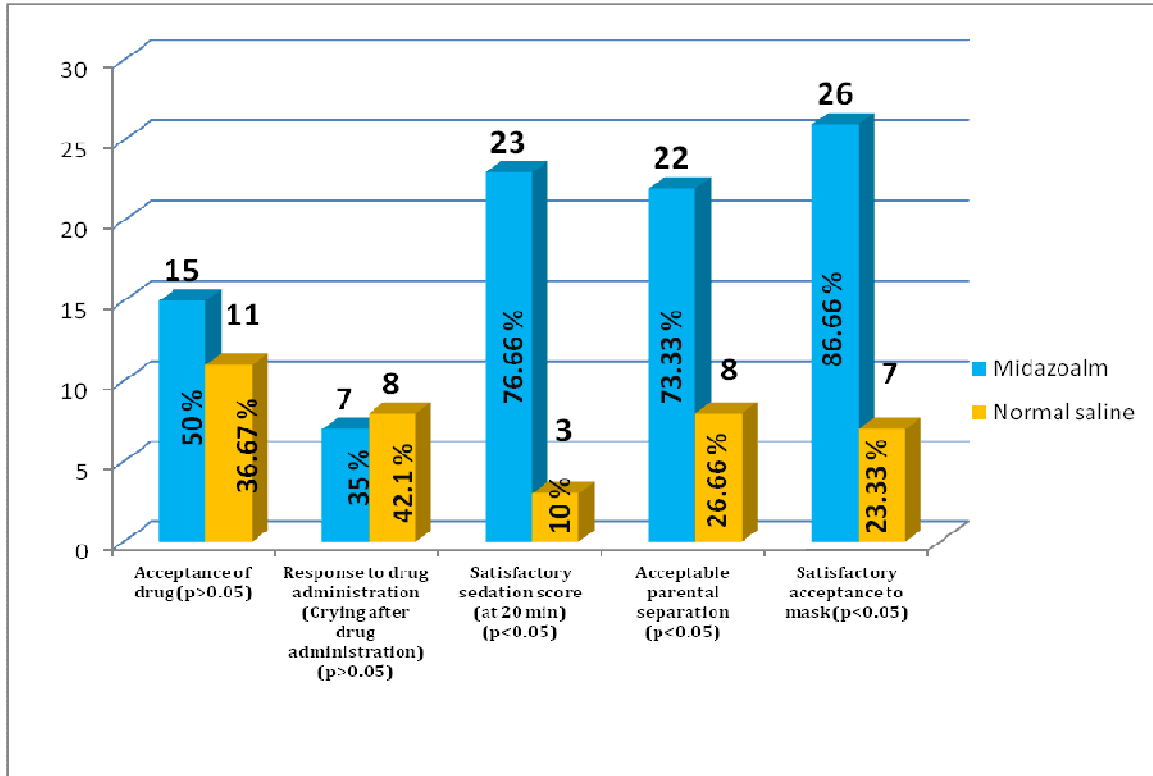


FIGURE 2

