



## A Study on Intravenous Sedation Versus Inhalation Sedation

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### دراسة حول التخدير الوريدي مقابل التخدير الإستنشاقى

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#### Abstract:

**Introduction:** Anesthesia is the cornerstone of modern medical and surgical practice, playing a vital role in enabling a wide range of diagnostic, therapeutic and surgical procedures. The primary goals of anesthesia include inducing unconsciousness, relieving pain, memory loss, muscle relaxation, and maintaining physiological stability throughout the period around the surgery. With continuous advances in anesthesia drugs and monitoring techniques, the practice of anesthesia has evolved significantly, allowing for safer procedures and improved patient outcomes. Inhalation and intravenous anesthesia remain among the most widely used techniques worldwide. **Aim of study:** This study aims to provide a comprehensive comparison between inhalation and intravenous anesthesia, focusing on their mechanisms of action, clinical applications, advantages, disadvantages, and associated side effects. By analyzing and comparing these two techniques, the research seeks to enhance understanding among anesthesiologists and contribute to improving the quality of care. **Methodology:** This study utilized a descriptive-analytical approach. Data was collected through a structured questionnaire distributed to a sample of 60 anesthesia practitioners working in hospitals in Misrata. The methodology focused on analyzing demographic variables, clinical practices, and pharmacological choices among the participants to evaluate the preferences and protocols used in different surgical scenarios. Data was collected using a structured questionnaire covering clinical practices and drug evaluations during the period from December 2025 to February 2026. **Results:** The results showed different preferences based on the clinical situation: short surgeries (less than 30 minutes): 45% of participants prefer intravenous anesthesia. Long surgeries (more than 3 hours): 55% prefer the combination of intravenous and inhalation anesthesia. Pediatric surgery: 31.7% prefer the combination of the two types, while 30% prefer inhaled anesthesia alone. Reasons for preference for intravenous anesthesia: "speed of initiation" was the main reason for 55% of participants. Reasons for preferring inhalation anesthesia: 38.3% considered the "speed of waking up" to be the main advantage. The most commonly used drugs: Induction: Propofol by 90%. Analgesia: Fentanyl by 83.3%. Maintenance: Isoflurane by 58.3%. **Conclusion:** In conclusion, strong alignment with modern global trends, highlighted by a clear preference for Propofol-based Total Intravenous Anesthesia (TIVA) in short procedures due to its rapid onset, and a balanced combined approach for complex surgeries. Furthermore, the significant shift away from Nitrous Oxide reflects a positive clinical evolution toward safer, modern volatile agents. However, the study uncovers critical operational challenges, including a prominent gap in protocol standardization and institutional resource limitations that directly restrict drug availability.

## الملخص:

**المقدمة:** يُعتبر التخدير حجر الأساس في الممارسة الطبية والجراحية الحديثة، حيث يلعب دورًا حيويًا في تمكين مجموعة واسعة من الإجراءات التشخيصية والعلاجية والجراحية. تتمثل الأهداف الرئيسية للتخدير في إحداث فقدان الوعي، وتخفيف الألم، وفقدان الذاكرة، وإرخاء العضلات، والحفاظ على الاستقرار الفسيولوجي طوال الفترة المحيطة بالجراحة. ومع التطور المستمر في أدوية التخدير وتقنيات المراقبة، تطورت ممارسة التخدير بشكل كبير، مما أدى إلى إجراءات أكثر أمانًا وتحسين نتائج المرضى. ولا يزال التخدير الإستنشاق والتخدير الوريدي من أكثر التقنيات استخدامًا حول العالم. هدف الدراسة: تهدف هذه الدراسة إلى تقديم مقارنة شاملة بين التخدير الإستنشاق والتخدير الوريدي، مع التركيز على آليات عملهما، واستخداماتهما السريرية، ومزاياهما، وعيوبهما، والآثار الجانبية المرتبطة بهما. ومن خلال تحليل ومقارنة هاتين الطريقتين، تسعى الدراسة إلى تعزيز الفهم لدى أطباء التخدير والمساهمة في تحسين جودة الرعاية الصحية. المنهجية: استخدمت هذه الدراسة المنهج الوصفي التحليلي. تم جمع البيانات من خلال استبيان منظم وُرِع على عينة مكونة من 60 من ممارسي التخدير العاملين في مستشفيات مصراة. ركزت المنهجية على تحليل المتغيرات الديموغرافية، والممارسات السريرية، والخيارات الدوائية بين المشاركين لتقييم التفضيلات والبروتوكولات المستخدمة في مختلف الحالات الجراحية. جُمعت البيانات باستخدام استبيان منظم يغطي الممارسات السريرية وتقييم الأدوية خلال الفترة من ديسمبر 2025 إلى فبراير 2026. النتائج: أظهرت النتائج اختلاف التفضيلات حسب الحالة السريرية: العمليات القصيرة (أقل من 30 دقيقة): فضل 45% من المشاركين التخدير الوريدي. العمليات الطويلة (أكثر من 3 ساعات): فضل 55% استخدام مزيج من التخدير الوريدي والإستنشاق. جراحة الأطفال: فضل 31.7% الدمج بين النوعين، بينما فضل 30% التخدير الإستنشاق وحده. أسباب تفضيل التخدير الوريدي: كانت سرعة بدء المفعول السبب الرئيسي لدى 55% من المشاركين. أسباب تفضيل التخدير الإستنشاق: اعتبر 38.3% أن "سرعة الاستيقاظ" هي الميزة الأساسية. الأدوية الأكثر استخدامًا: التحريض (Induction): بروپوفول بنسبة 90%. تسكين الألم (Analgesia): فنتانيل بنسبة 83.3%. المحافظة على التخدير (Maintenance): أيزوفلورين بنسبة 58.3%. الخاتمة: تقدم هذه الدراسة تقييماً أساسياً شاملاً لممارسات وتفضيلات التخدير الحالية بين المهنيين في مصراة. تظهر النتائج مواعمة قوية مع الاتجاهات العالمية الحديثة، التي أبرزها تفضيل واضح للتخدير الوريدي الكلي القائم على البروبوفول (TIVA) في الإجراءات القصيرة بسبب بدايته السريعة، ونهج مشترك متوازن للعمليات الجراحية المعقدة. علاوة على ذلك، يعكس التحول الكبير بعيداً عن أكسيد النيتروز تطوراً سريرياً إيجابياً نحو عوامل متطابرة حديثة وأكثر أماناً. ومع ذلك، تكشف الدراسة عن تحديات تشغيلية حاسمة، بما في ذلك فجوة بارزة في توحيد البروتوكول وقيود الموارد المؤسسية التي تقيد بشكل مباشر توافر الأدوية.

**الكلمات المفتاحية:** التخدير الوريدي، التخدير الإستنشاق، الأدوية، والجراحة.

## Introduction:

Anesthesia is an essential component of modern surgical practice, enabling patients to undergo procedures without experiencing pain or awareness. General anesthesia can be administered primarily through two methods: intravenous (IV) anesthesia and inhalational (volatile) anesthesia. Intravenous anesthesia is a cornerstone of contemporary anesthesiology, involving the direct administration of anesthetic agents into the bloodstream, which allows for rapid induction of unconsciousness and analgesia (Sahinovic, 2018). This technique is widely utilized for both the induction and maintenance of anesthesia across various surgical procedures. IV anesthetic agents primarily act on the central nervous system (CNS), particularly on gamma-aminobutyric acid (GABA) receptors, the principal inhibitory neurotransmitter receptors in the brain. By enhancing GABAergic activity or inhibiting excitatory pathways, such as N-methyl-D-aspartate (NMDA) receptors, these agents suppress neural activity, resulting in sedation, hypnosis, and loss of consciousness. Common IV anesthetics include propofol, etomidate, ketamine, and midazolam (Lu, 2023). The advantages of IV anesthesia include rapid induction, precise control over drug dosage and duration, minimal environmental impact compared to inhalational agents, and a reduced incidence of postoperative nausea and vomiting (PONV), particularly with propofol. IV anesthesia is employed in short surgical and diagnostic procedures, total intravenous anesthesia (TIVA) techniques, day-case surgeries, and intensive care sedation. With the development of newer agents and delivery systems, such as target-controlled infusion, IV anesthesia continues to evolve as a safe, efficient, and controllable alternative to inhalational methods (Nimmo et al., 2018). In contrast, inhalational anesthesia relies on volatile anesthetic gases, including sevoflurane, isoflurane, and desflurane, which are administered via a mask or endotracheal tube and absorbed through the lungs. This method is particularly suitable for maintaining anesthesia during prolonged surgeries due to its predictable depth and ease of titration. In clinical practice, balanced anesthesia techniques often combine intravenous and inhalational agents to optimize patient safety, comfort, and postoperative recovery. The choice of

an appropriate anesthetic method depends on multiple factors, including the patient’s medical condition, the type and duration of surgery, and the desired depth of anesthesia (Giovanni L et al., 2019).

**Material and methods:**

The research instrument used in the study was a survey questionnaire .The questionnaire is divided into four parts:

**Part I:** consists of the profile of the respondents that is composed of four questions including: education level, years of experience in anesthesia, duty, and workplace.

**Part II:** consists of clinical practices and preferences that is composed of five questions including: type of anesthesia do you usually prefer, the reasons for using only intravenous sedation in some cases, the advantages of using only inhalation anesthesia, cases where intravenous and inhalation anesthesia are used together, and any special that influence your choice of anesthesia type.

**Part III:** consists of evaluation and experience that is composed of three questions including: do most doctors in your workplace gravitate toward a certain type, are there recommendations or protocols that specify the type of anesthesia depending on the case, and would you like to receive additional training or workshops on improving the use of different anesthesia modalities.

**Part IV:** consists of pharmacological practices in anesthesia that is composed of five questions including: intravenous medications do you most commonly use in each of the following anesthesia categories, inhalation medications do you most commonly used for anesthesia, and assessment of the medications of anesthesia, factors influence your choice of a specific medication during anesthesia, and standardized protocols for medication selection.

**- Data gathering procedure**

The researchers secured all required approvals from the appropriate regulatory and institutional authorities prior to initiating the study. Data were collected through the administration of structured questionnaires to anesthesiologists work in various hospitals in Misurata. Written institutional consent was obtained from all hospitals before data collection commenced.

. They were also made aware of their right to withdraw from the study at any stage without any negative consequences.

**- Statistical treatment and data analysis**

The collected data were systematically organized, classified, and tabulated for analysis. Frequencies and percentage distributions were employed as primary statistical techniques to illustrate the number and proportion of observations within each category. These methods facilitated the comparison between intravenous and inhalational anesthesia. In addition, descriptive tables were utilized to present and clarify the findings of the study.

**- Search criteria**

- The target group includes anesthesiologists in Misurata.

**Results:**

**- Profile of respondents according to education level**

**Table (1)** Distribution of the Respondents according to education level

Category	Frequency	Percentage
Diploma degree	7	11.7%
Bachelor degree	34	56.7%
Specialist	8	13.3%
Arabic board	6	10.0%
Consultant	2	3.3%
Others	3	5.0%
Total	60	100%

Table 1 shows the percentage and Frequency distribution of respondents according to education level. There are 7(11.7%) of the respondents have diploma degree, 34(56.7%) have bachelor degree, 8(13.3%) have Specialist, 6(10.0%) have Arabic board, 2(3.3%) have Consultant and 3 (5.0%) have others.

**- Profile of respondents according to years of experience in anaesthesia**

**Table. (2)** Distribution of the Respondents according to years of experience in anaesthesia

Category	Frequency	Percentage
Less than one years	7	11.7%
1- 5 years	25	41.6%
6 -10 years	13	21.7%
More than 10 years	15	25.0%
Total	60	100%

Table 2 shows the percentage and Frequency distribution of respondents according to years of experience in anaesthesia. There are 7(11.97%) of the respondents have experience less than one year, 25(41.6%) of the respondents have experience from one to 5 years, 13 (21.7%) of the respondents have experience from 5 to 10 years and 15(25.0%) are more than 10 years' experience.

**- Profile of respondents according to duty**

**Table. (3)** Distribution of the Respondents according to duty

Category	Frequency	Percentage
Part time duty	24	40.0%
Full time duty	36	60.0%
Total	60	100%

Table 3 shows the Frequency percentage and distribution of respondents according duty. There are 24(40.0%) of respondents work part time duty and 36(60.0%) work full time duty.

**- Profile of respondents according to work place**

**Table. (4)** Distribution of the Respondents according to work place

Category	Frequency	Percentage
Governments hospital	15	25.0%
Private hospital	5	8.3%
Both	40	66.7%
Total	60	100%

Table 4 shows the Frequency percentage and distribution of respondents according to work place. There are 15(25.0%) of respondents work at governments hospital, 5(8.3%) work at private hospital and 40(66.7%) work at both.

**- Profile of respondents according to patient's short surgeries less than 30 minutes**

**Table (5)** Distribution of the respondents according to short surgeries less than 30 minutes

Category	Frequency	Percentage
Intravenous sedation	27	45.0%
Inhalational sedation	11	18.3%
Both combined	14	23.3%
Depending on the case	8	13.3%
Total	60	100%

Table 5 shows the percentage and Frequency distribution of respondents according to short surgeries less than 30 minutes. There are 27(45.0%) of respondents usually prefer intravenous sedation, 11(18.3%) of respondents usually prefer Inhalational sedation, 14(23.3%) of respondents usually prefer both combined and 8(13.3%) of respondents said depending on the case.

**- Profile of respondents according to long surgeries more than three hours**

**Table (6)** Distribution of the respondents according to long surgeries more than three hours

Category	Frequency	Percentage
Intravenous sedation	9	15.0%
Inhalational sedation	5	8.3%
Both combined	33	55.0%
Depending on the case	13	21.7%
Total	60	100%

Table 6 shows the percentage and Frequency distribution of respondents according to long surgeries more than three hours. There are 9(15.0%) of respondents usually prefer intravenous sedation, 5(8.3%) of respondents usually prefer Inhalational sedation, 33(55.0%) of respondents usually prefer both combined and 13(21.7%) of respondents said depending on the case.

**- Profile of respondents according to pediatric surgeries**

**Table (7)** Distribution of the respondents according to pediatric surgeries

Category	Frequency	Percentage
Intravenous sedation	6	10.0%
Inhalational sedation	18	30.0%
Both combined	19	31.7%
Depending on the case	17	28.3%
Total	60	100%

Table 7 shows the percentage and Frequency distribution of respondents according to pediatric surgeries. There are 6(10.0%) of respondents usually prefer intravenous sedation, 18(30.0%) of respondents usually prefer Inhalational sedation, 19(31.7%) of respondents usually prefer both combined and 17(28.3%) of respondents said depending on the case.

**- Profile of respondents according to chronic respiratory patients**

**Table. (8)** Distribution of the respondents according to chronic respiratory patients

Category	Frequency	Percentage
Intravenous sedation	17	28.3%
Inhalational sedation	2	3.3%
Both combined	16	26.7%
Depending on the case	25	41.7%
Total	60	100%

Table 8 shows the percentage and Frequency distribution of respondents according to chronic respiratory patients. There are 17(28.3%) of respondents usually prefer intravenous sedation, 2(3.3%) of respondents usually prefer Inhalational sedation, 16(26.7%) of respondents usually prefer both combined and 25(41.7%) of respondents said depending on the case.

**- Profile of respondents according to Cardiac patients**

**Table (9)** Distribution of the respondents according to cardiac patients

Category	Frequency	Percentage
Intravenous sedation	8	13.3%
Inhalational sedation	3	5.0%
Both combined	18	30.0%
Depending on the case	31	51.7%
Total	60	100%

Table 9 shows the percentage and Frequency distribution of respondents according to cardiac patients. There are 8(13.3%) of respondents usually prefer intravenous sedation, 3(5.0%) of respondents usually prefer Inhalational sedation, 18(30.0%) of respondents usually prefer both combined and 31(51.7%) of respondents said depending on the case.

**- Profile of respondents according to emergency surgeries**

**Table (10)** Distribution of the respondents according to emergency surgeries

Category	Frequency	Percentage
Intravenous sedation	23	38.3%
Inhalational sedation	2	3.3%
Both combined	19	31.7%
Depending on the case	16	26.7%
Total	60	100%

Table 10 shows the percentage and Frequency distribution of respondents according to emergency surgeries. There are 23(38.3%) of respondents usually prefer intravenous sedation, 2(3.3%) of respondents usually prefer Inhalational sedation, 19(31.7%) of respondents usually prefer both combined and 16(26.7%) of respondents said depending on the case.

**- Profile of respondents according to short diagnostic procedures**

**Table. (11)** Distribution of the respondents according to short diagnostic procedures

Category	Frequency	Percentage
Intravenous sedation	38	63.3%
Inhalational sedation	12	20.0%
Both combined	5	8.3%
Depending on the case	5	8.3%
Total	60	100%

Table 11 shows the percentage and Frequency distribution of respondents according to short diagnostic procedures. There are 38(63.3%) of respondents usually prefer intravenous sedation, 12(20.0%) of respondents usually prefer Inhalational sedation, 5(8.3%) of respondents usually prefer both combined and 5(8.3%) of respondents said depending on the case.

**- Profile of respondents according to reasons for using only intravenous sedation in some cases**

**Table. (12)** Distribution of the respondents according to reasons for using only intravenous sedation in some cases

Category	Frequency	Percentage
Rapid onset of effect	33	55.0%
Less respiratory impact	11	18.3%
Patient preference	1	1.7%
Availability of medication	10	16.7%
Ease of dose control	3	5.0%
Others	2	3.3%
Total	60	100%

Table 12 shows the percentage and frequency distribution of respondents according to reasons for using only intravenous sedation in some cases. There are 33(55.0%) of respondents said rapid onset of effect, 11(18.3%) of respondents said less respiratory impact, one (1.7%) of respondents said Patient preference, 10(16.7%) of respondents said Availability of medication, 3(5.0%) of respondents said Ease of dose control and 2 (3.3%) of respondents said other reasons.

**- Profile of respondents according to advantages of using only inhalation anesthesia**

**Table. (13)** Distribution of the respondents according to advantages of using only inhalation anesthesia

Category	Frequency	Percentage
Ease of adjusting depth during surgery	18	30.0%
Rapid recovery	23	38.3%
Common use in pediatrics	14	23.3%
Less renal/hepatic effects of some medications	1	1.7%
Others	4	6.7%
Total	60	100%

Table 13 shows the percentage and Frequency distribution of respondents according to advantages of using only inhalation anesthesia. There is 18(30.0%) of respondents said Ease of adjusting depth during surgery, 23(38.3%) of respondents said Rapid recovery, 14(23.3%) of respondents said Common use in pediatrics, one (1.7%) of respondents said Less renal/hepatic effects of some medications and 4(6.7%) of respondents said other reasons.

**4.2.10 Profile of respondents according when should you use both types together (intravenous + inhaled)**

**Table. (14)** Distribution of the respondents according to when should you use both types together (intravenous + inhaled)

Category	Frequency	Percentage
In complex and lengthy surgeries	39	65.0%
To achieve balanced anesthesia	10	16.7%
To reduce the total dose of each type	11	18.3%
Total	60	100%

Table 14 shows the percentage and Frequency distribution of respondents according to to when should you use both types together (intravenous + inhaled). There are 39(65.0%) of respondents said in complex and lengthy surgeries, 10(16.7%) of respondents said to achieve balanced anesthesia and 11(18.3%) of respondents said to reduce the total dose of each type.

**- Profile of respondents according to are there any special considerations that influence your choice of anesthesia type**

**Table (15)** Distribution of the respondents according to are there any special considerations that influence your choice of anesthesia type

Category	Frequency	Percentage
Yes	47	78.3%
No	13	21.7%
Total	60	100%

Table 15 shows the percentage and Frequency distribution of respondents according to to are there any special considerations (e.g., patient condition, availability of equipment, cost of medications) that influence your choice of anesthesia type. There is 47(78.3%) of respondents said yes and 13(21.7%) of respondents said no.

**- Profile of respondents according to are their recommendations or protocols that specify the type of anesthesia depending on the case**

**Table (16)** Distribution of the respondents according to are their recommendations or protocols that specify the type of anesthesia depending on the case

Category	Frequency	Percentage
Yes	48	80.0%
No	12	20.0%
Total	60	100%

Table 16 shows the percentage and Frequency distribution of respondents according to are their recommendations or protocols that specify the type of anesthesia depending on the case. There are 48(80.0%) of respondents said yes and 12(20.0%) of respondents said no.

**- Profile of respondents according to would you like to receive additional training or workshops on improving the use of different anesthesia modalities**

**Table (17)** Distribution of the respondents according to would you like to receive additional training or workshops on improving the use of different anesthesia modalities

Category	Frequency	Percentage
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Yes	38	63.3%
No	3	5.0%
Depending on the specialty	19	31.7%
Total	60	100%

Table 17 shows the percentage and Frequency distribution of respondents according to receive additional training or workshops on improving the use of different anesthesia modalities. There are 38 (63.3%) of respondents said yes, 3(5.0%) of respondents said no and 19(31.7%) of respondents declared that depending on the specialty.

**- Profile of respondents according to intravenous medications are most commonly use in Induction of Anesthesia**

**Table. (18)** Distribution of the respondents according to intravenous medications are most commonly use in Induction of Anesthesia

Category	Frequency	Percentage
Propofol	54	90.0%
Suamethonium	2	3.3%
Ketomine	2	3.3%
Dormicum	1	1.7%
Diprivan	1	1.7%
Total	60	100%

Table 18 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in Induction of Anesthesia. There are 54(90.0%) of respondents said Propofol, 2(3.3%) of respondents said Suamethonium as same as Ketomine and one (1.7%) of respondents said Dormicum as same as Diprivan.

**- Profile of respondents according to intravenous medications are most commonly use in maintenance of Anesthesia**

**Table (19)** Distribution of the respondents according to intravenous medications are most commonly use in maintenance of Anesthesia

Category	Frequency	Percentage
Inhalational	14	23.3%
Propofol	15	25.0%
Isoflurane	17	28.3%
Vecuronium	2	3.3%
Sevoflurane	10	16.7%
Diprivan	1	1.7%
Dormicum	1	1.7%
Total	60	100%

Table 19 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in maintenance of Anesthesia. There are 14(23.3%) of respondents said Inhalational,

15(25.0%) of respondents said Propofol, 17(28.3%) of respondents said Isoflurane, 10(16.7%) of respondents said Sevoflurane, 2(3.3%) of respondents said Vecuronium and one (1.7%) of respondents Diprivan as same as Dormicum.

**- Profile of respondents according to intravenous medications are most commonly use in Analgesia**

**Table (20)** Distribution of the respondents according to intravenous medications are most commonly use in Analgesia

Category	Frequency	Percentage
Fentanyl	50	83.3%
Opioros	2	3.3%
Morphine	1	1.7%
Ketorolac	2	3.3%
Pethidine	1	1.7%
Tramal	1	1.7%
Paracofamol	1	1.7%
Alfentanil	2	3.3%
Total	60	100%

Table 20 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in Analgesia. There are 50(83.3%) of respondents said Fentanyl, 2(3.3%) of respondents said Opioros as same as Ketorolac, Alfentanil and one (1.7%) of respondents said Morphine as same as Pethidine, Tramal, Paracofamol.

**- Profile of respondents according to intravenous medications are most commonly use in muscle relaxants**

**Table (21)** Distribution of the respondents according to intravenous medications are most commonly use in muscle relaxants

Category	Frequency	Percentage
Rocuronium	18	30.0%
Esmeron	38	63.3%
Non-depolarizing	1	1.7%
Scoline	2	3.3%
Suxamethonium	1	1.7%
Total	60	100%

Table 21 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in muscle relaxants. There are 18(30.0%) of respondents said Rocuronium, 38(63.3%) of respondents said Esmeron, 2(3.3%) of respondents said Scoline and one (1.7%) of respondents said Non-depolarizing as same as Suxamethonium.

**- Profile of respondents according to intravenous medications are most commonly use in Antiemetics**

**Table (22)** Distribution of the respondents according to intravenous medications are most commonly use in Antiemetics

Category	Frequency	Percentage
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Zofran	25	41.7%
Ondansetron	12	20.0%
Plasil	14	23.3%
Pethidine	1	1.7%
Desflurane	1	1.7%
Dexamethasone	4	6.7%
Accordingly	2	3.3%
Metoclopramide	1	1.7%
Total	60	100%

Table 22 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in Antiemetics. There are 25(41.7%) of respondents said Zofran, 12(20.0%) of respondents said Ondansetron as same as Plasil, 14(23.3%) of respondents said Dexamethasone, 2(3.3%) of respondents said Accordingly and one (1.7%) of respondents said Pethidine as same as Desflurane and Metoclopramide.

**- Profile of respondents according to intravenous medications are most commonly use in Initiation of anesthesia (especially in children)**

**Table (23)** Distribution of the respondents according to intravenous medications are most commonly use in Initiation of anesthesia (especially in children)

Category	Frequency	Percentage
Sevoflurane	51	85.0%
Halothane	2	3.3%
Isoflurane	2	3.3%
Ketamine	5	8.3%
Total	60	100%

Table 23 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in Initiation of anesthesia (especially in children). There are 51(85.0%) of respondents said Sevoflurane, 2(3.3%) of respondents said Halothane as same as Isoflurane and 5(8.3%) of respondents said Ketamine.

**- Profile of respondents according to intravenous medications are most commonly use in maintenance of anesthesia**

**Table (24)** Distribution of the respondents according to intravenous medications are most commonly use in maintenance of anesthesia

Category	Frequency	Percentage
Isoflurane	35	58.3%
Sevoflurane	21	35.0%
Halothane	4	6.7%
Total	60	100%

Table 24 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in maintenance of anesthesia. There are 35(58.3%) of respondents said Isoflurane, 21(35.0%) of respondents said Sevoflurane and 4 (6.7%) of respondents said Halothane.

**- Profile of respondents according to intravenous medications are most commonly use in speed of recovery**

**Table (25)** Distribution of the respondents according to intravenous medications are most commonly use in speed of recovery

Category	Frequency	Percentage
Sevoflurane	32	53.3%
Desflurane	20	33.3%
Isoflurane	4	6.7%
Neostigmine	3	5.0%
Naloxone	1	1.7%
Total	60	100%

Table 25 shows the percentage and Frequency distribution of respondents according to intravenous medications are most commonly use in speed of recovery. There are 32(53.3%) of respondents said Sevoflurane, 20(33.3%) of respondents said Desflurane, 4(6.7%) of respondents said Isoflurane, 3(5.0%) of respondents said Neostigmine and one (1.7%) of respondents said Naloxone.

**- Profile of respondents according to assessment of propofol**

**Table. (26)** Distribution of the respondents according to assessment of Propofol

Category	Frequency	Percentage
Very effective	56	93.3%
Moderately effective	4	6.7%
Total	60	100%

Table 26 shows the percentage and Frequency distribution of respondents according to assessment of Etomidate. There are 56(93.3%) of respondents said very effective and 4(6.7%) of respondents said Moderately effective.

**- Profile of respondents according to assessment of Etomidate**

**Table. (27)** Distribution of the respondents according to assessment of Etomidate

Category	Frequency	Percentage
Very effective	10	16.7%
Moderately effective	13	21.7%
Rarely used	20	33.3%
I do not use it	17	28.3%
Total	60	100%

Table 27 shows the percentage and Frequency distribution of respondents according to assessment of Etomidate. There are 10(16.7%) of respondents said very effective, 13(21.7%) of respondents said moderately effective, 20(33.3%) of respondents said Rarely used and 17(28.3%) of respondents said I do not use it.

**- Profile of respondents according to assessment of Ketamine**

**Table. (28)** Distribution of the respondents according to assessment of assessment of Ketamine

Category	Frequency	Percentage
Very effective	37	61.7%
Moderately effective	20	33.3%
Rarely used	2	3.3%
I do not use it	1	1.7%
Total	60	100%

Table 28 shows the percentage and Frequency distribution of respondents according to assessment of Ketamine. There are 37(61.7%) of respondents said very effective, 20(33.3%) of respondents said moderately effective, 2 (3.3%) of respondents said Rarely used and one(1.7%) of respondents said no.

**- Profile of respondents according to assessment of Midazolam**

**Table. (29)** Distribution of the respondents according to assessment of Midazolam

Category	Frequency	Percentage
Very effective	23	38.3%
Moderately effective	28	46.7%
Rarely used	9	15.0%
Total	60	100%

Table 29 shows the percentage and Frequency distribution of respondents according to assessment of Midazolam. There are 23(38.3%) of respondents said very effective, 28(46.7%) of respondents said moderately effective and 9(15.0%) of respondents said Rarely used.

**- Profile of respondents according to assessment of Fentanyl**

**Table (30)** Distribution of the respondents according to assessment of Fentanyl

Category	Frequency	Percentage
Very effective	53	88.3%
Moderately effective	7	11.7%
Total	60	100%

Table 30 shows the percentage and Frequency distribution of respondents according to assessment of Fentanyl. There are 53(88.3%) of respondents said very effective and 7(11.7%) of respondents said moderately effective.

**- Profile of respondents according to assessment of Sevoflurane**

**Table (31)** Distribution of the respondents according to assessment of Sevoflurane

Category	Frequency	Percentage
Very effective	51	85.0%
Moderately effective	8	13.3%
Rarely used	1	1.7%

Total	60	100%
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Table 31 shows the percentage and Frequency distribution of respondents according to assessment of Sevoflurane. There are 51(85.0%) of respondents said very effective, 8(13.3%) of respondents said moderately effective and one(1.7%) of respondents said Rarely used.

**- Profile of respondents according to assessment of Isoflurane**

**Table. (32)** Distribution of the respondents according to assessment of Isoflurane

Category	Frequency	Percentage
Very effective	47	78.3%
Moderately effective	12	20.0%
Rarely used	1	1.7%
Total	60	100%

Table 32 shows the percentage and Frequency distribution of respondents according to assessment of Isoflurane. There are 47(78.3%) of respondents said very effective, 12(20.0%) of respondents said moderately effective and one (1.7%) of respondents said Rarely used.

**- Profile of respondents according to assessment of Desflurane**

**Table (33)** Distribution of the respondents according to assessment of Desflurane

Category	Frequency	Percentage
Very effective	6	10.0%
Moderately effective	7	11.7%
Rarely used	20	33.3%
I do not use it	27	45.0%
Total	60	100%

Table 33 shows the percentage and Frequency distribution of respondents according to assessment of Desflurane. There are 6(10.0%) of respondents said very effective, 7(11.7%) of respondents said moderately effective, 20(33.3%) of respondents said Rarely used and 27(45.0%) of respondents said I do not use it

**- Profile of respondents according to assessment of Nitrous Oxide**

**Table. (34)** Distribution of the respondents according to assessment of Nitrous Oxide

Category	Frequency	Percentage
Very effective	2	3.3%
Moderately effective	12	20.0%
Rarely used	8	13.3%
I do not use it	38	63.3%
Total	60	100%

Table 34 shows the percentage and Frequency distribution of respondents according to assessment of Nitrous Oxide. There are 2(3.3%) of respondents said very effective, 12(20.0%) of respondents said moderately effective, 8(13.3%) of respondents said Rarely used and 38(63.3%) of respondents said I do not use it.

**- Profile of respondents according to what factors influence your choice of a specific medication during anesthesia**

**Table (35)** Distribution of the respondents according to what factors influence your choice of a specific medication during anesthesia

Category	Frequency	Percentage
Drug effectiveness	16	26.7%
Drug availability	14	23.3%
Patient's health condition	20	33.3%
Type of surgery	9	16.7%
Total	60	100%

Table 35 shows the percentage and Frequency distribution of respondents according to what factors influence your choice of a specific medication during anesthesia. There are 16(26.7%) of respondents said Drug effectiveness, 14(23.3%) of respondents said Drug availability, 20(33.3%) of respondents said Patient's health condition and 9(16.7%) of respondents type of surgery

**- Profile of respondents according to do you use standardized protocols for medication selection**

**Table (36)** Distribution of the respondents according to do you use standardized protocols for medication selection

Category	Frequency	Percentage
Yes	15	25.0%
No	9	15.0%
Sometimes depending on the case	36	60.0%
Total	60	100%

Table 36 shows the percentage and Frequency distribution of respondents according to do you use standardized protocols for medication selection. There are 15(25.0%) of respondents said yes, 9(15.0%) of respondents said no and 36(60.0%) of respondents said sometimes depending on the case.

**Discussion:**

The findings of the current study demonstrated a strong preference for intravenous (IV) anesthesia in short procedures (63.3%), owing to its rapid onset of action (55%). This local finding aligns with global trends reported in the review by Gupta et al. (2004), which confirmed that Total Intravenous Anesthesia (TIVA) ensures superior recovery quality for patients and reduces postoperative nausea and vomiting (PONV). Conversely, for prolonged surgeries (>3 hours), clinicians in Misrata demonstrated a balanced practice by combining inhalational and intravenous anesthesia (55%). This balance is consistent with the perspective of Schraag et al. (2018), who noted that inhalational anesthesia remains a practical and cost-effective option for routine and lengthy procedures due to the ease of monitoring anesthetic depth via Minimum Alveolar Concentration (MAC) values. Furthermore, combining both techniques helps minimize the side effects associated with high doses of inhalational gases. Our study reveals an almost total reliance on propofol (90%) and fentanyl (83.3%), accompanied by exceptionally high satisfaction rates. This reliance reflects a high level of clinical awareness regarding the scientifically documented benefits of these two compounds. The study by Enlund et al. (2014) emphasized the neuroprotective properties of propofol and the rapid recovery of patients' cognitive functions compared to inhalational gases. Moreover, this widespread use of propofol is supported by the findings of Lee et al. (2016), which demonstrated that propofol possesses anti-inflammatory properties that preserve the body's natural immunity compared to sevoflurane. Regarding the physiological response to surgery, the high dependency on fentanyl as a potent analgesic aligns with the results of Sivapurapu et al. (2017). Their study proved that intravenous anesthesia based on propofol and analgesics suppresses stress hormones (Cortisol) and maintains hemodynamic stability better than inhalational gases supplemented with nitrous oxide. A notable finding in our study is the non-use rate of nitrous

oxide, which reached 63.3%. This shift toward newer gases, such as sevoflurane, is backed by modern medical evidence. The study by Andrew et al. (2016) highlighted the safety of sevoflurane, noting that it does not cause significant neurotoxicity in children when used for less than an hour. However, it must be noted that our study revealed that 23.3% of clinicians' drug choices are influenced by their unavailability in local facilities within Misrata. This logistical constraint poses a challenge for practitioners. While many prefer TIVA for its environmental benefits and reduction of nausea (Schraag et al., 2018), or to reduce emergence delirium in children (Kanaya et al., 2005), the absence of medications or technologies may compel them to revert to traditional available alternatives. The study highlighted a gap in the standardization of medical protocols, with 60% of practitioners reporting that they follow them only "sometimes." This was accompanied by a high demand for continuous training (63.3%) on advanced techniques such as Target-Controlled Infusion (TCI) smart pumps. This lack of standardized protocols may impact hemodynamic stability during specialized surgeries, such as spinal surgeries, which demand strict protocols and coordination with intraoperative neuromonitoring (MEP). Despite the absence of standardized protocols, clinicians demonstrated high clinical flexibility, where the "patient's health status" emerged as the most critical decision-guiding factor (33.3%). This inclination toward "personalized anesthesia" demonstrates that local physicians balance scientific evidence—such as protecting the elderly from cognitive decline (Enlund et al., 2014) or avoiding emergence agitation in children (Kanaya et al., 2005)—with the individual physiological reserve of each patient.

### Conclusion:

This study provides a comprehensive baseline assessment of current anesthetic practices and preferences among professionals in Misrata. The findings demonstrate a strong alignment with modern global trends, highlighted by a clear preference for Propofol-based Total Intravenous Anesthesia (TIVA) in short procedures due to its rapid onset, and a balanced combined approach for complex surgeries. Furthermore, the significant shift away from Nitrous Oxide reflects a positive clinical evolution toward safer, modern volatile agents. However, the study uncovers critical operational challenges, including a prominent gap in protocol standardization and institutional resource limitations that directly restrict drug availability.

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