"THE EFFICACY OF 1% VERSUS 2% LIGNOCAINE SOLUTION ADMINISTERED BY "WORKING CHANNEL" METHOD FOR TOPICAL ANESTHESIA IN FLEXIBLE BRONCHOSCOPY WITHOUT ADMINISTRATION OF CONCURRENT LIGNOCAINE NEBULIZATION – ONE YEAR RCT"

Submitted by

REG NO. BR0121004

Dissertation

Submitted to the KLE Academy of Higher Education and Research, Belagavi, Karnataka

In Partial Fulfilment

of the Requirements for the Degree of

M.D. (Doctor of Medicine)

in

RESPIRATORY MEDICINE

DEPARTMENT OF RESPIRATORY MEDICINE

JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI, KARNATAKA

DECEMBER 2024/JANUARY 2025

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Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"THE EFFICACY OF 1% VERSUS 2% LIGNOCAINE SOLUTION ADMINISTERED BY "WORKING CHANNEL" METHOD FOR TOPICAL ANESTHESIA IN FLEXIBLE BRONCHOSCOPY WITHOUT ADMINISTRATION OF CONCURRENT LIGNOCAINE NEBULIZATION- ONE YEAR RCT"** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee.

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LIST OF ABBREVIATIONS

RCT	–	Randomized Control Trial
VAS	–	Visual Analogue Scale
CSS	–	Cough Severity Score
BAL	–	Bronchoalveolar Lavage
TBLB	–	Transbronchial Lung biopsy
TBNA	–	Transbronchial Needle Aspiration
ICU	–	Intensive Care Unit
IV	–	Intravenous
BMI	–	Body Mass Index
O2	–	Oxygen
RR	–	Respiratory Rate
BP	–	Blood Pressure
SPO2	–	Saturation
PR	–	Pulse Rate

ABSTRACT

INTRODUCTION

Flexible bronchoscopy is essential in respiratory medicine field for the diagnosis and management of respiratory conditions by direct airway visualization, enabling sample collection and many therapeutic interventions. Effective topical anesthesia is crucial for patient comfort and procedural safety as it is a day care procedure. Lignocaine, commonly used due to its efficacy and safety, is administered via nebulization, "spray-as-you-go," or direct application through the bronchoscope's working channel. While nebulization may cause uneven anesthetic distribution, the working channel method offers controlled application. This study compares the efficacy and safety of 1% versus 2% lignocaine solution administered via the working channel without nebulization, aiming to determine if a lower concentration can provide effective anesthesia with fewer risks and safer hemodynamic outcomes.

OBJECTIVES

- The primary objective of this study is to compare the hemodynamic effects of 1% versus 2% lignocaine used as a topical anesthetic during flexible bronchoscopy.

- Secondary objectives include evaluating patient comfort using the Visual Analog Scale (VAS), assessing operator satisfaction through cough severity score and cough count, determining the necessity for additional anesthesia methods, calculating the cumulative lignocaine doses, and identifying any procedural side effects of lignocaine.

- Additionally, the study aims to assess the impact of the topical anesthetic on bacterial cultures obtained during the procedure.

METHODS

This randomized controlled trial, conducted over a year at KLES Dr. Prabhakar Kore Charitable Hospital and Research Centre in Belagavi, aimed to compare the hemodynamic effects of 1% versus 2% lignocaine as a topical anesthetic in flexible bronchoscopy. With a sample size of 30 patients per group, participants were randomly assigned to receive either 1% or 2% lignocaine. Hemodynamic parameters, including pulse rate, blood pressure, and oxygen saturation, were monitored digitally during the procedure and manually before and after. Adverse effects, cough count, and pain were assessed using visual analog scales. Data on patient demographics, medical history, smoking and allergy history, and procedural details were meticulously recorded. The study adhered to ethical standards, obtaining informed consent and ensuring blinding of patients and operators. Statistical analysis was performed using SPSS, with significance determined at a p-value of less than 0.05.

RESULTS

The study compared the effects of 1% and 2% lignocaine solutions during bronchoscopy in 50 patients each. Both groups were similar in demographics and procedural details, with notable differences in physiological responses. Group 2 (2% lignocaine) experienced higher rates of bronchospasm (74%) compared to Group 1 (1% lignocaine, 28%), which was statistically significant. Respiratory rates were consistently higher in Group 2 during and after the procedure, particularly in response to procedural stimuli like laryngeal passage and suctioning. Systolic blood pressure

showed slight, non-significant elevations in both groups during the procedure, while oxygen saturation remained stable and comparable between groups. The cumulative dose of lignocaine was significantly higher in Group 2, yet patient-reported outcomes such as Visual Analog Scale (VAS) scores for procedural satisfaction and cough scores did not significantly differ between the groups. The study highlights the dose-dependent effects of lignocaine on physiological responses during bronchoscopy, underscoring the need for careful consideration of lignocaine concentration to optimize patient comfort and safety

CONCLUSION

The study concluded that, in the routinely done procedure like bronchoscopy the 1% lignocaine can be confidently used over 2% lignocaine to avoid more dose requirements of the drug with overall similar drug efficacy as 2% lignocaine and with a better safety profile and lesser drug reactions.2% lignocaine group showed increased physiological stress response during procedure.

KEY WORDS- Bronchoscopy, Lignocaine, Local Anesthesia, Side effects, Working channel

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INTRODUCTION

Background

Flexible bronchoscopy is a widely used procedure in pulmonary medicine, serving as a critical tool for diagnosing and managing a variety of respiratory conditions.[1]It allows for direct visualization of the airways, obtaining samples for diagnosis, and performing therapeutic interventions. While the procedure is minimally invasive compared to surgical methods, it still requires effective topical anesthesia to ensure patient comfort and reduce procedural-related stress and complications.[2]

Lignocaine (also known as lidocaine) is the most common anesthetic agent used in flexible bronchoscopy, owing to its efficacy in providing local anesthesia and its relative safety profile.[3] The administration of lignocaine is typically done through a combination of nebulization, "spray-as-you-go" methods, or direct application via the bronchoscope's working channel. However, the optimal concentration and method of administration remain subjects of clinical investigation.[4]

Nebulization, while effective, may lead to uneven distribution of the anesthetic and potential dispersion beyond the target area. The "working channel" method allows for direct and controlled application of lignocaine, potentially reducing the need for higher doses and improving patient outcomes. Previous studies have examined various methods and concentrations of lignocaine, with mixed results.[5,6] Some research suggests that higher concentrations offer better anesthetic effects, while others indicate that lower concentrations may be just as effective with reduced risk of adverse effects.[7]

This study aims to compare the efficacy of 1% versus 2% lignocaine solution administered by the "working channel" method, without concurrent nebulization, in flexible bronchoscopy. The aim is to determine if a lower concentration of lignocaine can provide effective topical anesthesia with fewer risks, offering a safer and to know the safety in hemodynamic variables with more efficient approach in flexible bronchoscopy.

Need for the Study

The rationale for conducting the present study on the efficacy of 1% versus 2% lignocaine solution administered through the "working channel" method in flexible bronchoscopy without concurrent lignocaine nebulization stems from a gap in current medical knowledge about the effect of the procedure and the need to optimize patient care. While lignocaine is the most common topical anesthetic in flexible bronchoscopy, the optimal concentration and method of administration remain subjects of ongoing research.[8]

The "working channel" method allows for direct application of lignocaine, offering precision and control over dosage. Comparing 1% and 2% lignocaine solutions in this context could provide insights into which concentration delivers the best outcomes in terms of patient comfort, hemodynamic stability, and procedure success, without increasing the risk of side effect of lignocaine.[9] The results of this study can improve the clinical practice of, reducing unnecessary drug exposure while maintaining or enhancing the efficacy of anesthesia, ultimately leading to improved patient safety and satisfaction.[10]

By comparing hemodynamic effects, this study could reveal whether certain lignocaine concentrations pose less risk to patients with cardiovascular concerns. The evaluation of patient comfort using the Visual Analog Scale (VAS) provides a direct measure of the patient's comfort experience, which is crucial to understand the discomfort of the procedure.[11,12] Similarly, assessing operator satisfaction and cough severity offers insights into the procedural efficiency and the potential need for additional anesthesia.[13] The study's broader impact extends to the assessment of procedural impact on patient hemodynamics and the cumulative dose of lignocaine required and its safety profile. Understanding these factors is essential to minimize risks and improve patient safety. Apart from these objectives the study also evaluates the effect of lignocaine on bacterial cultures in BAL samples which may highlight about the quality and reliability of BAL samples in relation to know the direct association of lignocaine on growth of the bacteria in samples obtained.[14]

AIM AND OBJECTIVES

Aim of the study

The primary aim of this study is to evaluate the efficacy of 1% versus 2% lignocaine solution administered via the "Working Channel" method as a topical anesthetic in flexible bronchoscopy, specifically focusing on its effects without the concurrent administration of lignocaine nebulization.

Objectives

Primary Objective -To compare the hemodynamic effects of 1% versus 2% lignocaine as a topical anesthetic.

Secondary Objectives –

1) To compare and assess patient comfort using the Visual Analog Scale (VAS), evaluate operator satisfaction by cough severity score and cough count, determine the need for other methods of anaesthesia, calculate cumulative doses of lignocaine, and identify procedural lignocaine side effects.
2) To assess the impact of the topical anesthetic on bacterial cultures obtained during the procedure.

REVIEW OF LITERATURE

Flexible Bronchoscopy

Flexible bronchoscopy is a minimally invasive procedure that allows pulmonologists to examine the airways and lungs. It involves the insertion of a thin, flexible tube, called a bronchoscope, through the nose or mouth, passing through the throat and into the lungs.[15] The bronchoscope is equipped with a camera and light, enabling detailed visualization of the trachea, bronchi. This procedure is a crucial tool in respiratory medicine, offering both diagnostic and therapeutic capabilities. Flexible bronchoscopy is commonly used to diagnose a range of respiratory conditions, by allowing direct visual examination and enabling techniques like bronchoalveolar lavage (BAL), bronchial brushings, and transbronchial lung biopsies (TBLB), Endobronchial mass biopsy. These methods provide valuable samples for further analysis, leading to accurate diagnosis and subsequent treatment planning.

Therapeutically, flexible bronchoscopy is used for a variety of interventions, such as removing foreign bodies, controlling airway bleeding, managing airway obstructions, placing stents, management of bronchopleural fistula, lung volume reduction procedures and thermoplasty. It also has applications in the intensive care unit (ICU), aiding in airway management, assessing tracheostomy tubes, bronchial wash in critical patients, management of collapse of lung, visualisation of the oesophageal fistulas etc.[16]

Flexible bronchoscopy has several advantages over rigid bronchoscopy, which is less frequently used today. The flexible nature of the bronchoscope allows access to peripheral airways, which rigid scopes cannot reach. The procedure is generally well-

tolerated by patients, often requiring only moderate sedation rather than general anesthesia, leading to quicker recovery times and reduced complications.[17] However, flexible bronchoscopy can cause discomfort and coughing, stressing the importance of effective topical anesthesia. Lignocaine is used for local anesthesia in bronchoscopic procedures, typically administered through a combination of "spray-as-you-go" techniques and direct application via the bronchoscope's working channel. Ensuring patient comfort and minimizing interference during the procedure are critical to its success, which makes exploring the optimal methods and concentrations of lignocaine essential in clinical practice.[18]

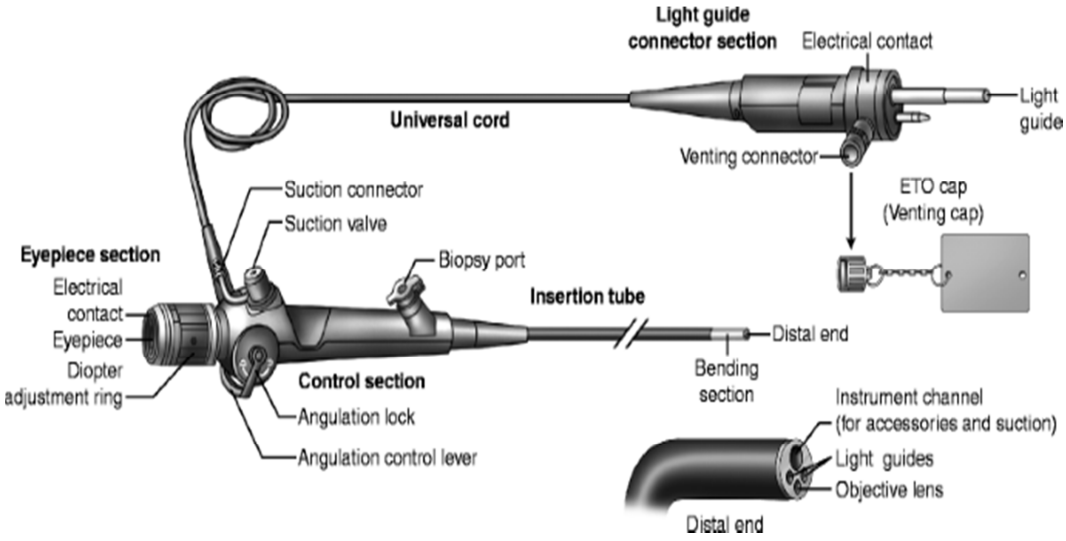


Figure 1: Schematic Diagram of Bronchoscopy

In the study by Roberto F. et al provide a comprehensive overview of the development and application of the flexible bronchoscope.[19] The flexible bronchoscope, popular for its ability to access distal airways with mild to moderate sedation, marks a significant advancement from the rigid bronchoscope introduced over a century ago by Dr Gustav Killian.[20] The article traces the history back to Shigeto Ikeda's presentation of the first flexible fiberoptic bronchoscope in 1966,

developed by Machida, and its subsequent commercialization in 1968. This innovation sparked a revolution in bronchoscopy, leading to improvements in image quality, angulation, and the introduction of a working channel. By the 1980s, Ikeda began developing a video bronchoscope. Creation of a bronchoscope with a miniature video camera in 1987, significantly enhancing image quality and visualization.

Role of Topical Anesthesia in Flexible Bronchoscopy

Flexible bronchoscopy, by its nature, can cause discomfort, triggering gag reflexes, coughing, and anxiety due to the insertion of a bronchoscope through the nose or mouth into the airways. Effective topical anesthesia, by reducing discomfort and anxiety, improves patient cooperation.[21]

Lignocaine (lidocaine) is the most commonly used topical anesthetic in bronchoscopy. It is applied in various forms, including sprays, gel, or solution and the application method varies depending on the procedure and patient tolerance. The anesthetic can be applied locally to naso-oro-pharynx, larynx, and trachea. While topical anesthetics improve comfort and the feasibility of bronchoscopy, their use must be balanced against the risk of systemic toxicity.[3] The dosage must be carefully calculated based on the patient's weight and health status, and monitoring for signs of lignocaine toxicity or allergic reactions is crucial.[22]

Pharmacokinetics of Lidocaine

Lidocaine, a widely used local anesthetic and antiarrhythmic agent, is known for its rapid onset of action and intermediate duration. Its pharmacokinetics, which

describe the absorption, distribution, metabolism, and excretion of the drug, play a crucial role in its therapeutic applications and safety profile.[23]

Absorption

Lidocaine can be administered via various routes, including intravenous, intramuscular, subcutaneous, and topical. The absorption rate depends on the administration route, with intravenous (IV) administration providing the fastest onset of action. Topical applications, like those used in flexible bronchoscopy, result in slower absorption due to the gradual uptake through the mucous membranes or skin.[24]

Distribution

Once absorbed, lidocaine is distributed throughout the body, with significant affinity for highly perfused organs such as the liver, heart, lungs, and brain. It is approximately 60-80% bound to plasma proteins, primarily alpha-1-acid glycoprotein, which affects its bioavailability and active concentration. The drug's volume of distribution is about 0.7 to 1.5 liters per kilogram, indicating extensive distribution into tissues.[25]

Metabolism

Lidocaine is primarily metabolized in the liver through the cytochrome P450 (CYP) system, mainly by CYP1A2 and CYP3A4 enzymes. The metabolism of lidocaine leads to the formation of various metabolites, with monoethylglycinexylidide (MEGX) and glycinexylidide (GX) being the most significant. These metabolites retain some pharmacological activity and can contribute to the drug's effects and potential toxicity.[26]

Excretion

Lidocaine and its metabolites are excreted primarily through the kidneys. The half-life of lidocaine in plasma ranges from 1.5 to 2 hours, with complete elimination occurring within 6 to 12 hours, depending on liver function and other individual factors. In cases of renal impairment, the excretion of metabolites may be prolonged, leading to an increased risk of adverse effects.

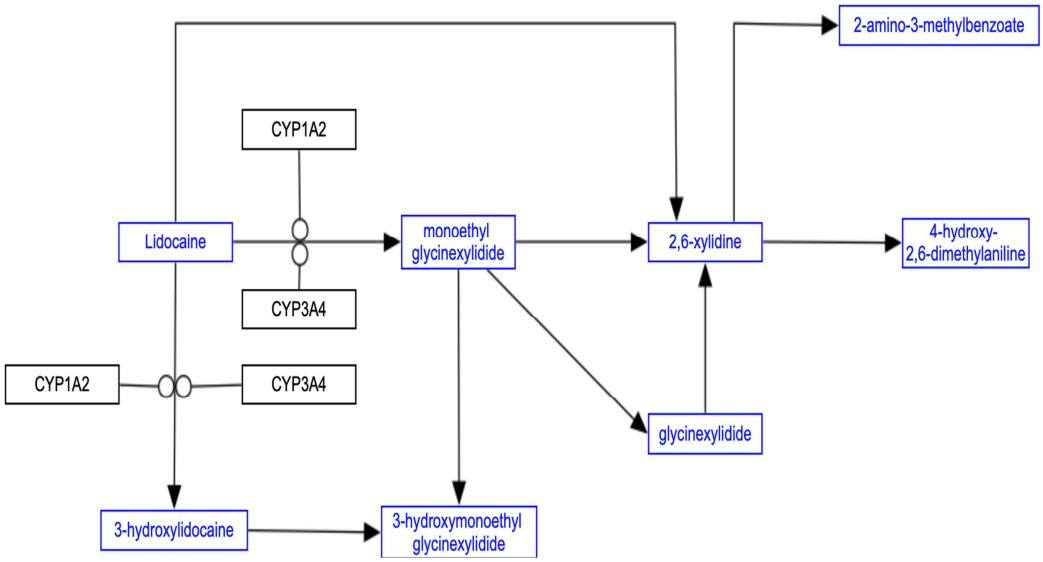


Figure 2: Schematic diagram of Pharmacokinetics of Lidocaine

Mechanism of Action

Lidocaine exerts its effect primarily by binding to the intracellular portion of voltage-gated sodium channels (Nav), inhibiting sodium ion influx. This blockade has multiple effects, depending on whether it's used as a local anesthetic or antiarrhythmic agent.

Voltage-Gated Sodium Channel Blockade: Lidocaine binds to the S6 segment of the channel's domain III and IV, blocking sodium influx into the neuron. This prevents depolarization and, consequently, the initiation and propagation of action potentials in peripheral nerves.

Reduced Nerve Conduction: By inhibiting sodium influx, lidocaine prevents nerve impulses from reaching the central nervous system, leading to temporary loss of sensation (anesthesia) in the targeted area.

Selective Action on Active Neurons: Lidocaine preferentially binds to active or open sodium channels, which are more prevalent in rapidly firing or damaged nerves. This selectivity results in an effective local anesthetic effect without significant systemic effects.[27]

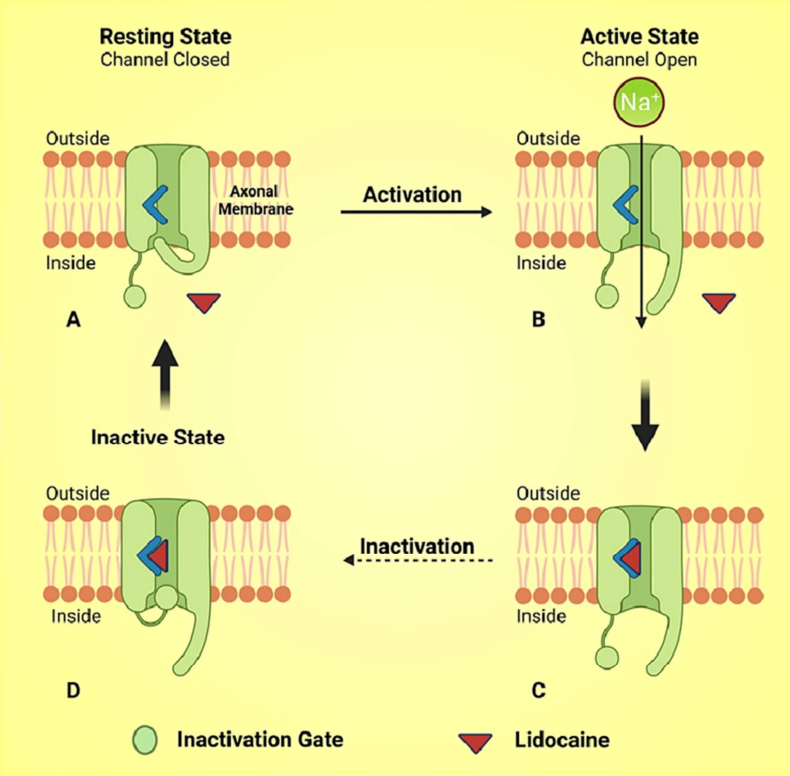


Figure 3: Mechanism of action of lidocaine

In a consensus statement by the American College of Chest Physicians published in CHEST Journal in 2011, Momen M. Wahidi et al. addressed the use of topical anesthesia, analgesia, and sedation in adult patients undergoing flexible bronchoscopy.[28] The expert panel, after reviewing literature from 1969 to 2009, suggested the use of lignocaine for enhanced patient tolerance and satisfaction with no contraindication. The consensus highlighted that anticholinergic agents do not significantly impact bronchoscopy and discouraged their use. Lidocaine emerged as the preferred topical anesthetic due to its short half-life and safety.[29] Additionally, the combined use of benzodiazepines and opiates was recommended for their synergistic effects on patient tolerance and the antitussive properties of opioids. Propofol was also recognized as an effective sedative, comparable to benzodiazepines and opiates in achieving sedation and patient tolerance. The statement concluded by advising physicians to consider using these agents in appropriate patient populations, underscoring their safety and effectiveness in bronchoscopic procedures.[30]

Lignocaine Concentrations in Clinical Use

Comparison of 1% and 2% Lignocaine Solutions

In clinical use, lignocaine solutions are predominantly available in 1% and 2% concentrations, used depending on the requirements based on their efficacy, safety, and suitability for various medical procedures. A 2% solution, being more concentrated, offers a stronger and longer-lasting anesthetic effect. This makes it particularly useful in longer or more invasive procedures where sustained anesthesia is necessary. The more potent effect can ensure patient comfort and cooperation over extended periods, which is crucial in complex diagnostic or therapeutic interventions.

In contrast, a 1% lignocaine solution, with its lower concentration, is often adequate for shorter or less invasive procedures.[31] It provides sufficient anesthesia while minimizing the risk of over-anesthetising the area, allowing for a quicker return of sensation post-procedure. There is no difference between 1 % and 2% lignocaine solution in onset of action and potency.[31]

When it comes to safety, the concentration of lignocaine plays a critical role. Higher concentrations, such as the 2% solution, carry a greater risk of systemic absorption, which can lead to toxicity. Symptoms of lignocaine toxicity include central nervous system effects like dizziness and disorientation, and in severe cases, respiratory or cardiac complications. Therefore, though a 2% solution might provide better anesthesia, it also requires careful monitoring and judicious use, especially in patients with certain health conditions or in procedures where more dosage might be needed. The 1% solution, with its lower concentration, has a reduced risk of systemic toxicity, making it a safer choice for a broader range of patients and procedures. It is particularly preferred in situations where minimizing the risk of adverse reactions is paramount.[32]

The common clinical applications of these concentrations also vary. The choice between 1% and 2% lignocaine solutions in clinical practice involves a trade-off between the desired strength and duration of anesthesia and the safety profile of the drug. The choice of the drug is guided by the nature of the procedure, fitness for procedure, comorbidities and the specific requirements for anesthesia during the intervention.

In a randomized, double-blind study conducted by Mainland et al., the optimal lidocaine solution for airway anesthesia by aspiration was investigated in 96 adult patients undergoing diagnostic flexible bronchoscopy.[33] Patients were divided into groups receiving varying concentrations and volumes of lidocaine: 1% (0.2 or 0.3 mL/kg), 1.5% (0.2 mL/kg), or 2% (0.2 or 0.3 mL/kg). The effectiveness of anesthesia was assessed by tolerance to bronchoscopy without sustained coughing and the need for additional lidocaine. Plasma concentrations of lidocaine were measured in some patients, with no signs of toxicity observed. The study concluded that all solutions provided effective airway anesthesia to the carina, suitable for awake intubation, with a recommendation for using 1% lidocaine at 0.2 to 0.3 mL/kg, amounting to a total volume of 10 to 20 mL. This technique was deemed safe and effective for the majority of the patients

In a pilot double-blind randomized controlled trial by Biswal et al. at the, the effectiveness of 1% versus 2% lignocaine for airway anesthesia in endobronchial ultrasound-guided transbronchial needle aspiration (EBUS- TBNA) was compared.[34] Participants were divided to receive either concentration for "spray-as-you-go" administration, in addition to moderate intravenous sedation with midazolam and fentanyl. Both groups received pharyngeal lignocaine spray and nebulized lignocaine, with additional doses administered at the operator's discretion. Primary endpoints included operator-rated procedural satisfaction and cough, measured using a visual analogue scale (VAS), while secondary outcomes focused on patient- rated pain scores, cumulative lignocaine dose, midazolam/fentanyl doses, and adverse events. Results indicated no significant difference in operator satisfaction or cough severity between the two groups. However, the cumulative lignocaine dose was significantly higher in the 2% group. The study concluded that 1% lignocaine is as

effective as 2% for topical anesthesia in EBUS-TBNA, but with a lower cumulative dose, suggesting a potential preference for the 1% concentration in similar procedures.

Madan et al. conducted a study involving 500 consecutive patients undergoing bronchoscopy, who were randomly allocated to receive either 1% or 2% lignocaine solution using the spray-as-you-go technique without lignocaine nebulisation. All participants received lignocaine spray. Primary outcomes included overall procedural satisfaction rated by the operator, visual analogue scale (VAS) assessments of cough by both the operator and patients, and patient-rated pain on the faces pain scale. Secondary objectives encompassed the total lignocaine dose administered, cumulative lignocaine dose, and procedural complications. The study demonstrates that for topical airway anesthesia during bronchoscopy, 1% lignocaine achieves comparable efficacy to 2% lignocaine but at a significantly lower dose, utilizing the spray-as-you-go method without concurrent nebulized lignocaine administration.[35]

In a study by H. Kaur et al., 500 consecutive patients were randomly assigned to receive either 1% or 2% lignocaine solution through the bronchoscope using the "spray-as-you-go" technique. The primary outcomes measured were cough assessment by the operator and patient using the visual analog scale (VAS), and pain assessment using the faces pain rating scale. Secondary outcomes included the total lignocaine dose, oxygenation status, adverse reactions related to lignocaine, and other factors. The results showed that 1% lignocaine is as effective as 2% lignocaine for topical anesthesia during FB, but at significantly lower doses. Therefore, 1% lignocaine is recommended as the preferred concentration for topical anesthesia of

the larynx and tracheobronchial tree during FB.[36]

These studies are comparable to our studies in fulfilling our aims and objectives, more or less similar parameters will be studied

Lignocaine Toxicity

Lignocaine (also known as lidocaine) toxicity refers to adverse effects that occur when the level of lignocaine in the body exceeds a safe threshold. This can happen due to overdose, excessive absorption, or improper administration, particularly in procedures like flexible bronchoscopy, dental procedures, or other medical interventions involving local anesthetics. Understanding the causes, symptoms, and management of lignocaine toxicity is crucial for healthcare professionals to ensure patient safety. It is recommended that lidocaine dose in bronchoscopy be limited to

<8.2 mg/kg. Lidocaine toxicity is conventionally accepted to be likely above serum concentrations of 5 mg/mL, although studies suggest that subjective side effects may occur at much lower serum concentrations.[37]

In our study knowing the side effect profile, all the general measures were taken into consideration for side effect of the lignocaine during the procedure.

Causes of Lignocaine Toxicity

- Administering a higher dose of lignocaine than recommended can lead to toxicity. This can occur if multiple doses are given too quickly or if the total dose exceeds safety guidelines.
- Lignocaine can be absorbed into the bloodstream more quickly than

expected, especially in areas with high vascularity, leading to systemic effects.

- Incorrect injection technique or application of lignocaine to damaged or inflamed tissue can increase absorption and risk toxicity.
- Certain medications can interact with lignocaine, altering its metabolism or increasing its systemic absorption.[38]

Symptoms of Lignocaine Toxicity

Lignocaine toxicity can manifest with a range of symptoms affecting the central nervous system (CNS), Respiratory system and cardiovascular system (CVS):

- CNS Symptoms: Dizziness, confusion, agitation, restlessness, slurred speech, tinnitus (ringing in the ears), and muscle twitching are early signs of toxicity. In severe cases, it can lead to seizures, respiratory depression, or coma.
- CVS Symptoms: Hypotension (low blood pressure), bradycardia (slow heart rate), arrhythmias, or cardiac arrest. These symptoms may follow CNS symptoms or occur independently in cases of significant toxicity.
- Respiratory Symptoms – Bronchospasm due histamine airway responsiveness and effect of preservative.[39]

In a case study conducted by Matthew Hensley and Benjamin H. Singer , an alternative to lidocaine for topical anesthesia in bronchoscopy was explored in a 73-year-old male with a severe lidocaine allergy. Faced with the need for bronchoscopy, the patient was successfully anesthetized using 2% chloroprocaine, and administered using a "spray-as-you-go" technique, along with moderate conscious sedation. This approach was necessitated by the patient's history of severe allergic reactions to

lidocaine and other related agents. The procedure, which involved minimal coughing and was well-tolerated by the patient, demonstrated chloroprocaine as a viable alternative anesthetic for bronchoscopy in patients with lidocaine allergies, offering a significant clinical insight for handling similar cases.[40]

In a study by S. Loukides et al. the serum concentrations of lignocaine during fiberoptic bronchoscopy (FOB) were investigated. The study aimed to record plasma concentrations of lignocaine before, during, and after FOB, and to assess the correlation between doses used for nasal and tracheobronchial anesthesia with peak serum concentrations.[41] The study involved twelve patients undergoing FOB, where lignocaine was administered as a 2% solution and gel, with a total average dose of 622 mg. Blood samples were taken at various intervals to measure lignocaine levels. The results indicated that peak plasma concentrations occurred within 20-30 minutes post- anesthesia in most patients, but none reached toxic levels. A significant correlation was found between the total and tracheobronchial lignocaine doses and peak serum concentration, while no correlation was observed with the dose for nasal anesthesia. The study concluded that despite exceeding the recommended dose of lignocaine, no toxic levels were observed in the blood, highlighting the safety of the used dosages in FOB.

In our study the dose of the lignocaine which will be used is 1 percentage and 2 percentage, but the blood levels for toxicity are not measured in this study.

Management and Treatment

The management of lignocaine toxicity involves prompt recognition of symptoms and appropriate medical intervention:

- If lignocaine toxicity is suspected, administration of the drug should be stopped, and medical help should be sought immediately.
- Patients with mild symptoms may need oxygen, IV fluids, or monitoring of vital signs. In severe cases, advanced life support, such as intubation or cardiopulmonary resuscitation (CPR), may be required.
- In cases of CNS-related symptoms, benzodiazepines like diazepine can be used to control seizures. For cardiovascular symptoms, anti-arrhythmic medications or vasopressors may be required.
- Lipid emulsion therapy is used in cases of severe toxicity to absorb and neutralize lignocaine, reducing its toxic effects.

1) Administer a bolus of Intralipid® 20% (1.5 ml/kg based on lean body mass) over 1 minute, followed by a continuous infusion of Intralipid® 20% (0.25 ml/kg/min based on lean body mass). This infusion should be maintained for at least 10 minutes after hemodynamic stability is achieved.

2) If hemodynamic stability is not achieved, consider administering up to two additional boluses of Intralipid® 20% (1.5 ml/kg each), followed by a continuous infusion of Intralipid® 20% at an increased rate of 0.5 ml/kg/min.; and

3) The initial dosage of Intralipid® 20% should not exceed approximately 10 ml/kg over a 30-minute period. [42]

Impact of lignocaine on Bacterial Culture

The primary function of lignocaine is to block sodium channels in nerve cells, thereby inhibiting nerve signal transmission, which provides effective anesthesia and pain relief. However, this pharmacological action raises questions about whether lignocaine might also possess antimicrobial properties, potentially affecting the sensitivity of bacterial cultures used in diagnostic procedures. In clinical contexts like flexible bronchoscopy, where bacterial cultures are commonly taken for diagnostic purposes, understanding lignocaine's impact on culture sensitivity is essential. Bacterial culture sensitivity refers to the ability to detect and identify bacteria in samples. If lignocaine has an antimicrobial effect, it could potentially inhibit bacterial growth, leading to false-negative results and misinterpretations. This risk could compromise diagnostic accuracy and, ultimately, patient care.[43]

Clinical studies on this topic are somewhat limited, but evidence suggests that the impact of lignocaine on bacterial cultures may depend on its concentration and method of administration. Lower concentrations, such as 1% or 2%, typically used in flexible bronchoscopy, seem to have a minimal impact on bacterial culture sensitivity. However, higher concentrations might exert some antimicrobial activity, leading to reduced bacterial growth and compromised culture results. These findings indicate that while lignocaine can potentially affect culture sensitivity, its impact is generally low at the concentrations used in most clinical settings.[44]

Despite the relatively low risk, clinicians should exercise caution when using lignocaine in procedures where bacterial cultures are critical for diagnosis. To minimize any potential interference, healthcare providers can opt for lower concentrations of lignocaine and ensure careful sampling techniques to avoid

contamination. Accurate interpretation of culture results is also key, with clinicians advised to consider the possibility of false negatives due to lignocaine's potential antimicrobial effects. The implications for clinical practice are clear: while lignocaine is generally safe and effective at typical concentrations, practitioners must remain vigilant about its potential to affect bacterial cultures. Further research into lignocaine's impact on bacterial growth and culture sensitivity will help establish definitive guidelines for its use in diagnostic procedures involving bacterial sampling. So in our study one of our secondary objective is to study impact of lignocaine in bacterial culture.

Lignocaine Administration for Bronchoscopy

Nebulization is a widely used method where lignocaine is converted into an aerosol form that the patient inhales through a nebulizer mask or mouthpiece. This approach allows for the anesthetic to be distributed evenly throughout the airways, numbing the nasal passages, pharynx, larynx, trachea, and bronchi. However, the level of anesthesia achieved through nebulization may be less controlled compared to direct application, and it requires patient cooperation for effective delivery.

Direct application, on the other hand, involves instilling or spraying lignocaine directly onto the mucosal surfaces of the airways. This can be done using a syringe and catheter or a spray device attached to the bronchoscope which allows for more precise targeting of the anesthesia. This method provides a more concentrated and effective anesthetic effect but requires more skill and experience to perform correctly and safely. In many clinical settings, a combination of both nebulization and direct application is employed. The need for specific equipment, like a suitable catheter make spray catheter method more difficult.

The "Working Channel" method represents a significant advancement in the administration of lignocaine for flexible bronchoscopy, designed to enhance the precision and effectiveness of anesthesia delivery. In the "Working Channel" method, lignocaine is administered through the bronchoscope's working channel, a pathway within the bronchoscope that allows the passage of instruments and fluids. By allowing for the precise application of lignocaine, the "Working Channel" method reduces the likelihood of over-anesthetizing areas, thus minimizing potential side effects like excessive cough suppression or respiratory complications. This method also potentially reduces the total amount of lignocaine used, thereby decreasing the risk of systemic toxicity.[54] One major challenge of "Working Channel" method is the requirement of skill and experience for effective administration. Incorrect application can lead to inadequate anesthesia or, conversely, over-administration, resulting in complications such as bronchospasm. There is also the risk of localized overdose if too much lignocaine is applied to a particular area, which can lead to local complications like mucosal irritation. Additionally, if not administered carefully, this method can result in uneven anesthesia, with some areas being adequately numbed while others are not, which can be particularly problematic in procedures requiring widespread anesthesia across the airways. Moreover, in patients with anatomical variations or those with severe airway sensitivity, achieving effective anesthesia using this method can be more challenging.[45]

S. Dhooria et al studied nebulized lignocaine, lignocaine spray or their combination for topical anesthesia during diagnostic flexible bronchoscopy in 1500 patients concluded that ten actuations of 10 % lignocaine oropharyngeal spray were superior to nebulized lignocaine or their combination for topical anesthesia during diagnostic flexible bronchoscopy.[3]

In a study done by K. Madan et al study nebulized lignocaine for topical anaesthesia in no-sedation bronchoscopy (NEBULA): A placebo-controlled, double-blinded randomized controlled trial found that administering nebulized lignocaine along with pharyngeal lignocaine spray during unsedated bronchoscopy leads to a higher cumulative dose of lignocaine without improving procedural comfort. Additional nebulized lignocaine during bronchoscopy is not recommended. In our study nebulized lignocaine is not used, only 1% and 2% lignocaine is given through the working channel.[9]

In a study by Kavitha et al., comparing the spray catheter with the "spray-as-you-go" technique for airway anesthesia during flexible bronchoscopy without nebulization, findings showed that using the Spray Catheter reduced cough, minimized the requirement for sedation, and enhanced operator satisfaction. Patients allocated to the "Working Channel group" received 2 ml of 2% lignocaine (21.3 mg lignocaine/ml) administered at the vocal cords, 1 ml each in the trachea and carina, and 1 ml in each main bronchus. Patients in the "Spray Catheter group" received an equivalent volume of lignocaine in the same anatomical sites via the spray catheter, with additional lignocaine administered as per the operator's discretion. The same has been done in our study as lignocaine is instilled through the working channel without giving nebulization.[46]

METHODOLOGY

2.1 Source of Data: Patients who underwent bronchoscopy at the department of Respiratory Medicine at KLES Dr Prabhakar Kore Charitable Hospital and Research Centre, Belagavi, served as the source of data.

2.2 Study Design: A randomized control trial was conducted.

2.3 Study Period: The study was carried out over one year.

2.4 Sample Size: The sample size was estimated using the difference in hemodynamic changes, specifically SBP, between 1% lignocaine and 2% lignocaine from the study by Harpreet Kaur et al. as 122 ± 5 mmHg and 126 ± 4 mmHg, respectively.[57] At a 95% confidence limit and 90% power, the sample size required for each group was calculated to be 27 using the following formula and MedCalc sample size software. Considering a 10% non-response rate, the sample size was adjusted to approximately 30 cases per group.

Sample Size Estimation Formula:

$$n = \frac{2SD^2 (Z_{\alpha/2} + Z_{\beta})^2}{d^2}$$

Where,

$Z\alpha = 1.960$

$Z\beta = 1.280$

Standard deviations for each group: sd1=5, sd2=4

The pooled standard deviation (SD) is calculated as SD=sd1+sd2/2

Means for each group: Mean 1=122, Mean 2=126

Difference in means (d) = Mean 1−Mean 2

$$n = \frac{4.5^2 \times (1.96+1.28)^2}{4^2}$$

n = 27

With 10% non-response rate,

Sample size n = 30 cases will be included in each group

2.5 Sampling Technique: Patients were randomized in a 1:1 ratio to receive either 1% or 2% lignocaine solution. The randomization sequence was computer-generated, and the assignments were placed in sealed opaque envelopes. Blinding was maintained for the patient, the bronchoscopist and sisters to the concentration of lignocaine solution used for the procedure.

The investigator was aware about the concentration and blinding.

2.6 Inclusion Criteria

In the present study, participants were included based on the following criteria:

- Indication for flexible bronchoscopy
- The age group of 18 to 90 years
- Hemodynamic stability (defined as systolic BP<150 mm Hg and diastolic BP< 100 mm Hg, not on inotropes)

2.7 Exclusion Criteria

The exclusion criteria applied in the selection of study participants were:

- Pregnancy
- Hypoxemia (oxygen saturation [by pulse oximetry], 92% with F io2 of 0.3)
- Failure to provide informed consent
- Hypersensitivity to lignocaine
- Bronchoscopy done through endotracheal or tracheostomy tube
- Procedure performed under general anesthesia
- Patients who received lignocaine nebulization for the bronchoscopy were excluded.

2.8 Study Protocol

The study was conducted at KLE's Dr Prabhakar Kore Charitable Hospital and Medical Research Center, Belagavi. Potential candidates for the study were identified through a screening process that assessed whether they met the aforementioned inclusion and exclusion criteria. Upon the approval of the ethics committee, written informed consent was obtained from all individuals who were enrolled in the study. This consent process ensured that participants were fully informed about the nature of the study, the procedures involved, the potential risks, and their rights as study participants, including the right to withdraw from the study at any point without any consequences to their medical care.

2.9 Data Collection

During the study, a one-year hospital-based randomized control trial was executed. Informed consent was obtained from each patient before inclusion in the trial. Before the bronchoscopy procedure, patients were tested for PT, INR, aPTT, and viral markers. Eligible patients those who met the inclusion criteria were randomly assigned to treatment groups via a computer-generated sequence. The demographic details such as age, sex, height, weight, smoking history, BMI, and type of bronchoscopy procedure (BAL, EBB,TBNA TBLB) were meticulously recorded for all participants. Half of the patients received 1% lignocaine and the other half received 2% lignocaine as a topical anesthetic through the working channel of the bronchoscope.

Hemodynamic parameters including pulse rate, blood pressure, and oxygen saturation were continuously monitored digitally during the procedure and manually for blood pressure before and after the procedure. Respiratory rate was also monitored before and after the procedure. Observations for any adverse effects related to lignocaine, such as arrhythmia, involuntary movements, convulsions, anaphylaxis, and bronchospasm, were documented. The cough count during the procedure was recorded, and the bronchoscopist assessed the intensity of the patient's cough and pain using a visual analogue scale immediately post-procedure (Figure 4). Once stabilized, patients were asked to self-assess their cough and pain using the visual analogue scale (Figure 5) and the faces pain rating scale, respectively. The faces pain scale consisted of six facial expressions corresponding to increasing pain levels, rated on an ordinal scale from 0 to 5. Data on each patient's personal, medical, and surgical history, along with their smoking and allergy history, were gathered and recorded in a standardized

case performa. Changes in hemodynamic parameters at key points during the procedure, such as larynx passage and suctioning, were specifically noted. The cumulative doses of lignocaine used, any additional anesthetic methods required, and side effects of lignocaine were all catalogued for subsequent analysis.

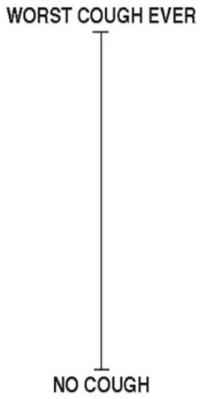


Figure 4: Visual Analogue Scale (VAS) for measuring cough severity

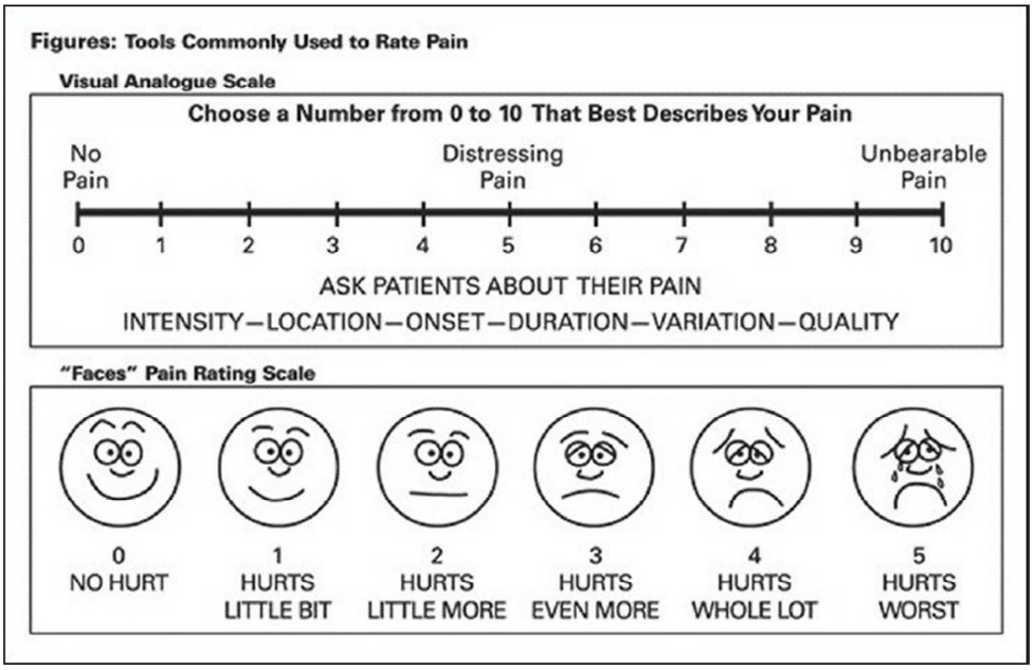


Figure 5: Visual Analogue Scale (VAS) for measuring pain

2.10 Statistical Analysis

Data was collected in a Microsoft Excel sheet and then analysed using SPSS (Statistical Package for the Social Sciences) software, version 22. For the representation of categorical data, frequencies and proportions were used, with the Chi-square test serving as the test of significance. Continuous data, on the other hand, were presented through means and standard deviations. The Independent t-test was employed to determine the significance of mean differences between two distinct groups. A p-value of less than 0.05 was considered indicative of statistical significance.

RESULTS

Table 1. Characteristic data of the study population in group 1(1% Lignocaine)

Parameters	**n**	**Mean**		**Median**		**Range**	
		Mean	**SD**	**Median**	**IQR**	**Min**	**Max**
Age (Years)	50	50.74	15.58	50.00	27.25	23.00	86.00
Height (Cm)	50	165.58	8.04	168.00	14.00	153.00	185.00
Weight (Kg)	50	58.14	10.28	58.00	14.25	32.00	90.00
BMI (Kg/m^2)	50	21.17	3.29	20.95	3.81	12.68	31.86
Hemodynamic parameters before Procedure							
PR before proc. (per minute)	50	92.80	13.04	91.00	16.25	63.00	128.00
Systolic BP before proc. (mm Hg)	50	123.08	11.21	120.00	11.50	100.00	150.00
Diastolic BP before proc. (mm Hg)	50	77.00	7.35	80.00	10.00	60.00	100.00
RR before proc. (per minute)	50	21.06	2.51	20.50	2.00	16.00	30.00
O2 requirement before proc. (L/min)	8	2.75	1.16	2.00	1.35	2.00	5.00
SPO2 before proc. (%)	50	97.12	1.51	98.00	2.00	94.00	99.00
Hemodynamic parameters during Procedure							
PR during proc. (per minute)	50	109.12	17.27	110.00	22.00	65.00	146.00
Systolic BP during proc. (mm Hg)	50	127.24	11.28	124.00	12.50	106.00	150.00
Diastolic BP during proc. (mm Hg)	50	77.62	7.34	80.00	10.00	60.00	100.00
RR during proc. (per minute)	50	25.90	3.05	26.00	4.00	20.00	38.00
O2 requirement during proc. (L/min)	25	4.28	2.22	4.00	2.00	2.00	10.00
SPO2 during proc. (%)	50	96.40	2.58	98.00	4.00	88.00	99.00
Hemodynamic parameters after Procedure							
PR after proc. (per minute)	50	100.40	12.21	100.00	16.50	76.00	130.00
Systolic BP after proc. (mm Hg)	50	126.96	11.29	120.00	11.00	100.00	150.00
Diastolic BP after proc.	50	77.68	7.65	80.00	10.00	60.00	100.00

(mm Hg)							
RR after proc. (per minute)	50	24.40	3.19	24.00	3.25	18.00	38.00
O2 requirement after proc. (L/min)	19	2.79	1.31	2.00	2.00	1.00	5.00
SPO2 after proc. (%)	50	96.72	1.57	97.50	2.25	94.00	99.00
Hemodynamic parameters while passing larynx							
HR while passing larynx (per minute)	50	109.28	16.66	108.00	22.00	68.00	146.00
Systolic BP while passing larynx (mm Hg)	50	127.84	10.86	124.00	12.50	110.00	150.00
Diastolic BP while passing larynx (mm Hg)	50	77.60	7.26	80.00	10.00	60.00	100.00
RR while passing larynx (per minute)	50	25.82	2.92	26.00	4.00	20.00	38.00
O2 requirement while passing larynx (L/min)	25	4.28	2.22	4.00	2.00	2.00	10.00
SPO2 while passing larynx (%)	50	96.38	2.59	98.00	4.00	88.00	99.00
Hemodynamic parameters while suctioning							
HR while suctioning (per minute)	50	109.20	16.35	109.00	22.50	68.00	144.00
Systolic BP while suctioning (mm Hg)	50	128.44	10.48	130.00	12.50	110.00	150.00
Diastolic BP while suctioning (mm Hg)	50	77.56	7.22	80.00	10.00	60.00	100.00
RR while suctioning (per minute)	50	25.80	2.96	26.00	4.00	20.00	38.00
O2 requirement while suctioning (L/min)	26	4.04	2.27	3.00	3.00	2.00	10.00
SPO2 while suctioning (%)	50	96.30	2.58	98.00	4.00	88.00	99.00
Post Procedural Data							
CSS by Bronchoscopist	50	19.20	9.60	20.00	5.00	10.00	60.00
CSS by Patient	50	19.78	7.57	20.00	5.00	10.00	50.00
Cough count by Investigator	50	20.00	10.82	18.00	13.00	5.00	56.00
Lignocaine dose(mg)	50	100.99	15.68	106.50	0.00	53.25	106.50
VAS pain Bronchoscopist	50	0.90	0.50	1.00	0.00	0.00	2.00
VAS pain patient	50	1.30	0.58	1.00	1.00	0.00	2.00

Table 2. Characteristic data of the study population in group 2(2% Lignocaine)

Parameters	n	Mean		Median		Range	
		Mean	SD	Median	IQR	Min	Max
Age(Years)	50	49.56	16.06	50.00	20.25	18.00	80.00
Height (Cm)	50	163.80	7.72	166.00	14.00	145.00	178.00
Weight (Kg)	50	55.32	9.22	56.00	18.00	38.00	75.00
BMI (Kg/m^2)	50	20.65	3.49	20.42	3.78	15.39	28.76
Hemodynamic parameters before Procedure							
PR before proc. (per minute)	50	90.72	10.61	90.00	14.00	70.00	120.00
Systolic BP before proc. (mm Hg)	50	122.20	11.48	120.00	12.50	100.00	160.00
Diastolic BP before proc. (mm Hg)	50	77.24	6.83	80.00	10.00	60.00	90.00
RR before proc. (per minute)	50	21.86	1.99	22.00	4.00	16.00	26.00
O2 requirement before proc. (L/min)	8	3.13	1.12	3.00	2.00	2.00	5.00
SPO2 before proc. (%)	50	96.94	2.03	98.00	2.00	88.00	99.00
Hemodynamic parameters during Procedure							
PR during proc. (per minute)	50	114.80	13.97	114.00	20.00	90.00	160.00
Systolic BP during proc. (mm Hg)	50	129.00	11.29	130.00	17.00	100.00	160.00
Diastolic BP during proc. (mm Hg)	50	79.64	8.20	80.00	1.50	60.00	110.00
RR during proc. (per minute)	50	27.34	2.53	28.00	2.00	18.00	36.00
O2 requirement during proc. (L/min)	38	4.00	2.19	3.50	3.00	2.00	10.00
SPO2 during proc. (%)	50	96.68	2.10	98.00	3.00	90.00	99.00
Hemodynamic parameters after Procedure							
PR after proc. (per minute)	50	104.46	10.59	102.00	13.50	82.00	130.00
Systolic BP after proc. (mm Hg)	50	128.52	11.32	130.00	11.00	100.00	160.00
Diastolic BP after proc. (mm Hg)	50	78.76	7.68	80.00	10.00	60.00	110.00
RR after proc. (per minute)	50	25.72	2.77	26.00	4.00	16.00	34.00
O2 requirement after	23	2.74	1.25	2.00	2.00	1.00	5.00

proc. (L/min)							
SPO2 after proc. (%)	50	96.66	1.84	98.00	2.25	92.00	99.00
Hemodynamic parameters while passing larynx							
HR while passing larynx (per minute)	50	114.88	13.97	114.00	18.00	90.00	156.00
Systolic BP while passing larynx (mm Hg)	50	129.20	11.04	130.00	12.50	100.00	160.00
Diastolic BP while passing larynx (mm Hg)	50	79.68	8.24	80.00	1.50	60.00	110.00
RR while passing larynx (per minute)	50	27.12	1.80	28.00	2.00	22.00	30.00
O2 requirement while passing larynx (L/min)	38	4.05	2.20	4.00	3.00	1.00	10.00
SPO2 while passing larynx (%)	50	96.74	1.95	98.00	3.00	92.00	99.00
Hemodynamic parameters while suctioning							
HR while suctioning (per minute)	50	115.96	14.33	115.00	18.00	90.00	166.00
Systolic BP while suctioning (mm Hg)	50	129.80	10.97	130.00	20.00	100.00	160.00
Diastolic BP while suctioning (mm Hg)	50	79.60	8.32	80.00	2.50	60.00	110.00
RR while suctioning (per minute)	50	27.16	2.38	28.00	2.00	18.00	34.00
O2 requirement while suctioning (L/min)	38	3.97	2.22	3.50	3.00	1.00	10.00
SPO2 while suctioning (%)	50	96.68	2.04	98.00	3.00	92.00	99.00
Post Procedural Data							
CSS by Bronchoscopist	50	19.54	9.68	20.00	6.25	0.00	60.00
CSS by Patient	50	19.90	9.39	20.00	10.00	5.00	60.00
Cough count by Investigator	50	28.86	30.06	20.00	19.25	4.00	216.00
Lignocaine dose(mg)	50	225.78	51.10	213.00	0.00	213.00	426.00
VAS pain Bronchoscopist	50	0.92	0.44	1.00	0.00	0.00	2.00
VAS pain patient	50	1.30	0.50	1.00	1.00	0.00	3.00

Table 3. Sex distribution

Sex	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
Male	33	66.00	28	56.00
Female	17	34.00	22	44.00
Total	**50**	**100.00**	**50**	**100.00**

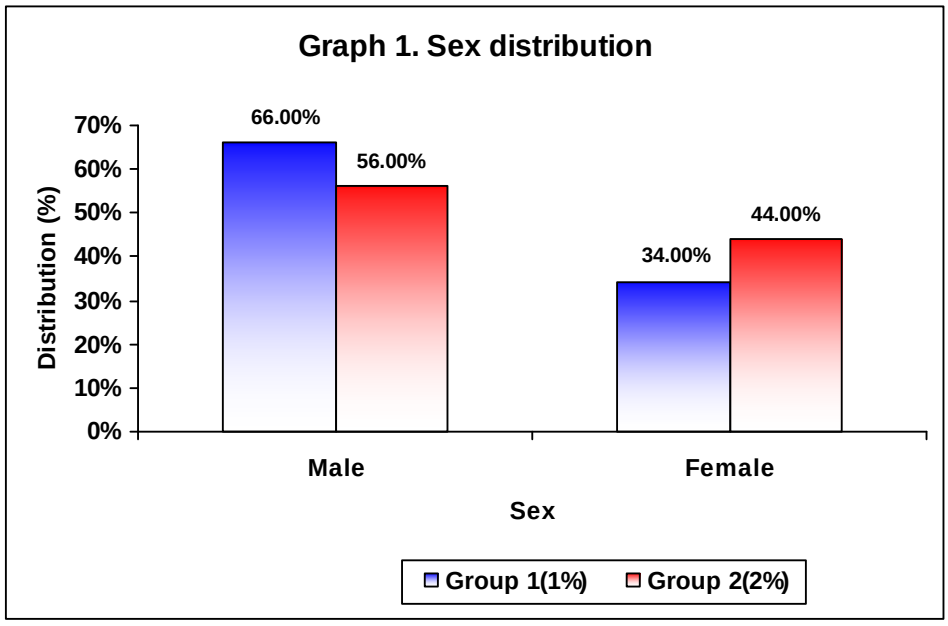


Table 3 & Graph 1 illustrates the gender distribution across two distinct groups in the study. It shows that in Group 1, 66% of the participants are male and 34% are female. Group 2 has a more even distribution, with males making up 56% and females 44%.

Table 4. Comparison of age distribution

Age group (Years)	Group 1(1%)		Group 2 (2%)	
	Number	**Percentage**	**Number**	**Percentage**
18-30	3	6.00	6	12.00
31-40	12	24.00	9	18.00
41-50	11	22.00	13	26.00
51-60	7	14.00	10	20.00
61-70	12	24.00	6	12.00
71-80	4	8.00	6	12.00
81-90	1	2.00	0	0.00
Total	**50**	**100.00**	**50**	**100.00**

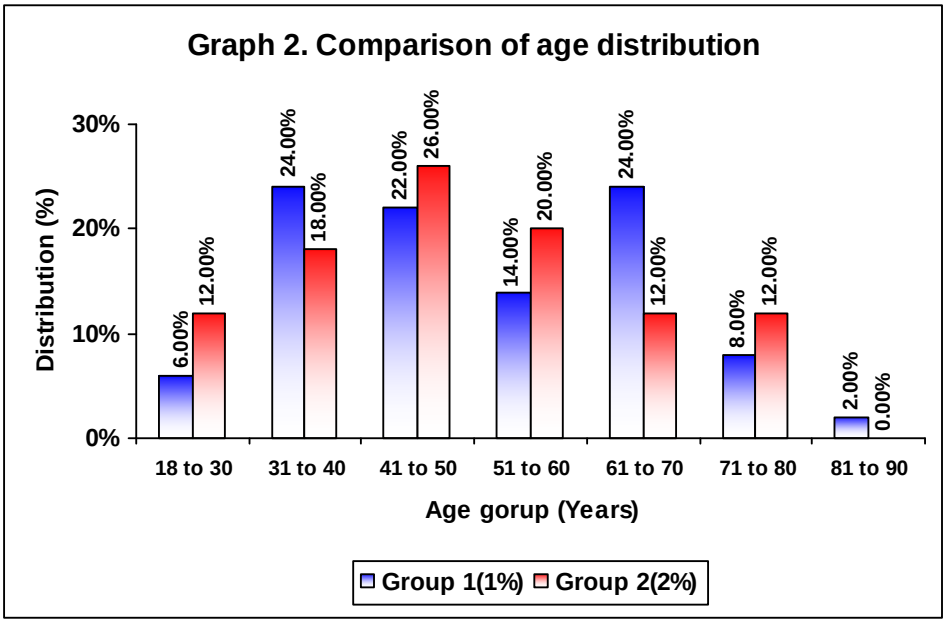


Table 4 & Graph 2 illustrates the age distribution comparison between Group 1 and Group 2 in the study. In the youngest age category of 18 to 30 years, Group 1 includes 6 percent of participants while Group 2 has twice that proportion at 12 percent. For the 31 to 40 years range, Group 1 comprises 24 percent of its members, whereas Group 2 has a slightly lower representation at 18 percent. Patients in the 41 to 50 years category, Group 1 accounts for 22 percent and Group 2 is slightly more at 26 percent. Participants aged 51 to 60 years make up 14 percent of Group 1 and 20 percent of Group 2. In the 61 to 70 years bracket, the proportion in Group 1 increases to 24 percent, which is double the 12 percent in Group 2.

Table 5. Comparison of procedure performed

Procedure	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
BAL	41	82.00	36	72.00
TBLB, BAL	8	16.00	14	28.00
TBNA, BAL	1	2.00	0	0.00
Total	**50**	**100.00**	**50**	**100.00**

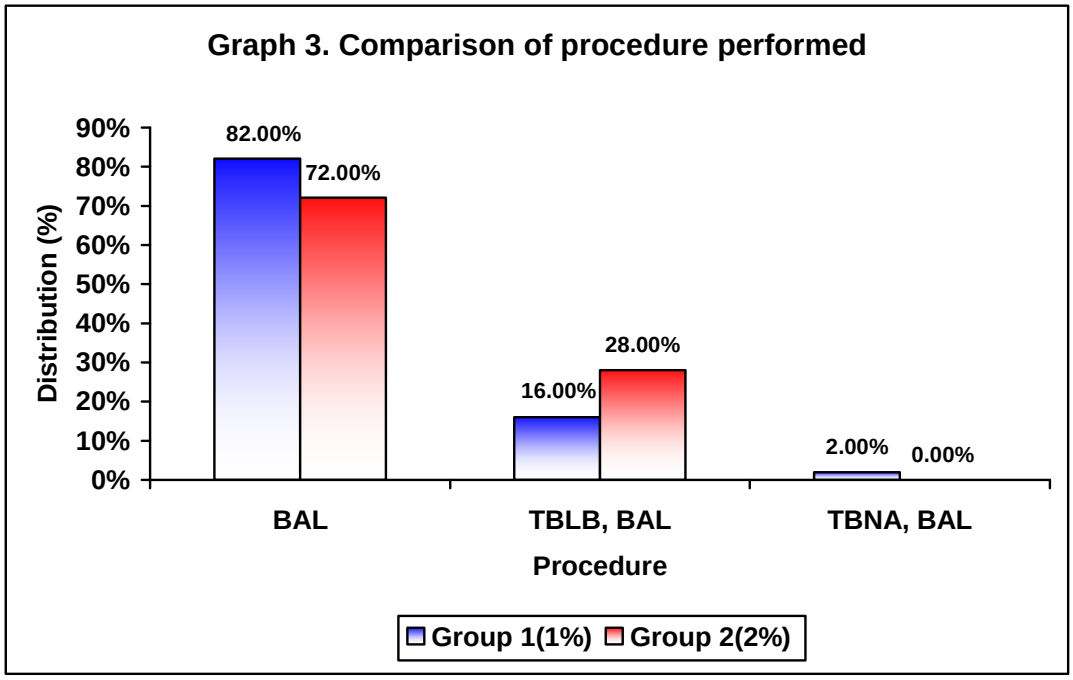


Table 5 & Graph 3. Compares the types of bronchoscopy procedures performed on participants in two different groups in the study. In Group 1, a significant majority, 82 percent, underwent bronchoalveolar lavage (BAL), compared to 72 percent in Group 2. Procedures combining transbronchial lung biopsy (TBLB) with BAL were performed on 16 percent of Group 1, which is notably less than the 28 percent in Group 2. Transbronchial needle aspiration (TBNA) in conjunction with BAL was the least common and was exclusive to Group 1, with only 2 percent undergoing this procedure; Group 2 did not have any participants receiving TBNA. The graph indicates that while BAL is the predominant procedure in both groups, the utilization of additional procedures such as TBLB varies between the two groups.

Table 6. Percentage of comorbidities

Comorbidities	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
HTN	5	10.00	5	10.00
HTN,T2DM	8	16.00	8	16.00
IHD	0	0.00	1	2.00
T2DM	4	8.00	11	22.00
T2DM,HTN,IHD	1	2.00	1	2.00
T2DM,Hypothyrodism	1	2.00	0	0.00
T2DM,IHD	1	2.00	0	0.00
Absent	30	60.00	24	48.00
Total	**50**	**100.00**	**50**	**100.00**

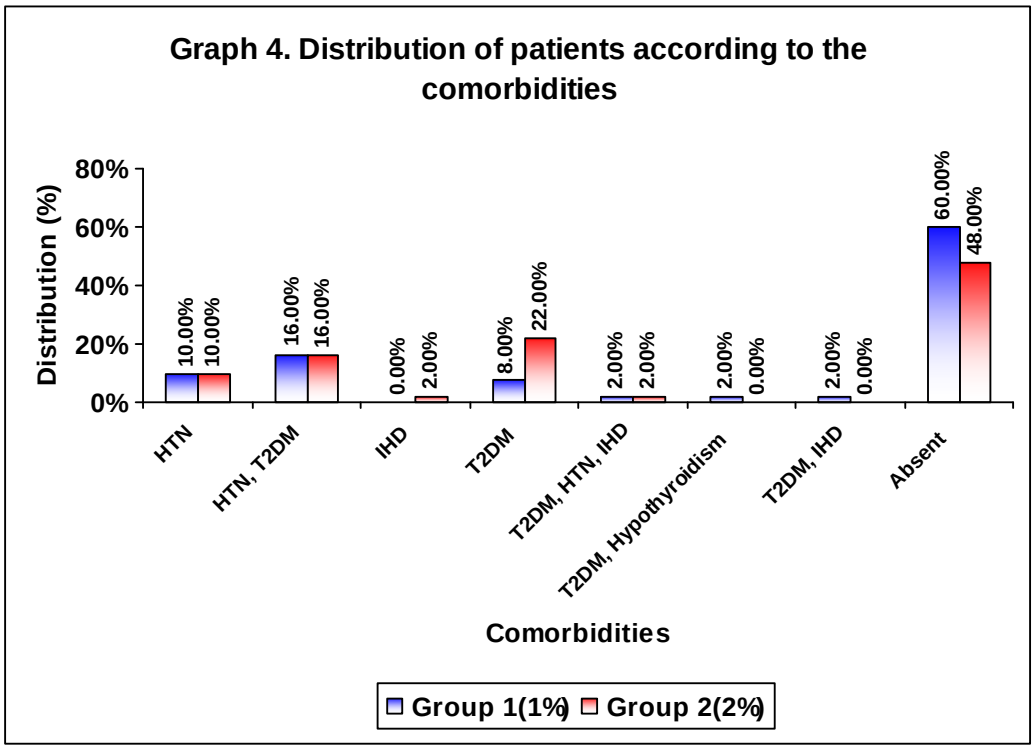


Table 6 & Graph 4. Illustrates the distribution of patients according to their comorbidities, comparing Group 1 and Group 2 in a bar chart format. Both groups have an identical percentage of patients with hypertension (HTN) at 10 percent. Similarly, the comorbidity of HTN combined with type 2 diabetes mellitus (T2DM) is equally prevalent in both groups at 16 percent. The presence of ischemic heart disease (IHD) alone is 2 % in Group 2. Group 2 has a notably higher proportion of patients with only T2DM at 22 percent, compared to Group 1 with 8 percent. The combination of T2DM, HTN, and IHD, as well as T2DM with hypothyroidism, are present in a small fraction (2 percent) of Group 1, but not in Group 2. Group 1 also has a small percentage of patients with T2DM and IHD at 2 percent, absent in Group 2. 60% of patients in Group 1 and 48% patients in Group 2 had no comorbidities.

Table 7. Distribution of patients according to the past history

Past history	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
BA	1	2.00	1	2.00
Ca Hypopharynx	0	0.00	1	2.00
CKD, Anaemia	0	0.00	1	2.00
CLD	1	2.00	0	0.00
EPTB	0	0.00	2	4.00
IHD, Ca Esophagus	1	2.00	0	0.00
MDRTB	1	2.00	0	0.00
Pemphigus Vulgaris	1	2.00	0	0.00
Potts spine	1	2.00	0	0.00
PTB	19	38.00	9	18.00
Renal Calculi	1	2.00	0	0.00
RHD	1	2.00	0	0.00
Seizure disorder, PTB	1	2.00	0	0.00
Vasculitis	1	2.00	0	0.00
Absent	21	42.00	36	72.00
Total	**50**	**100.00**	**50**	**100.00**

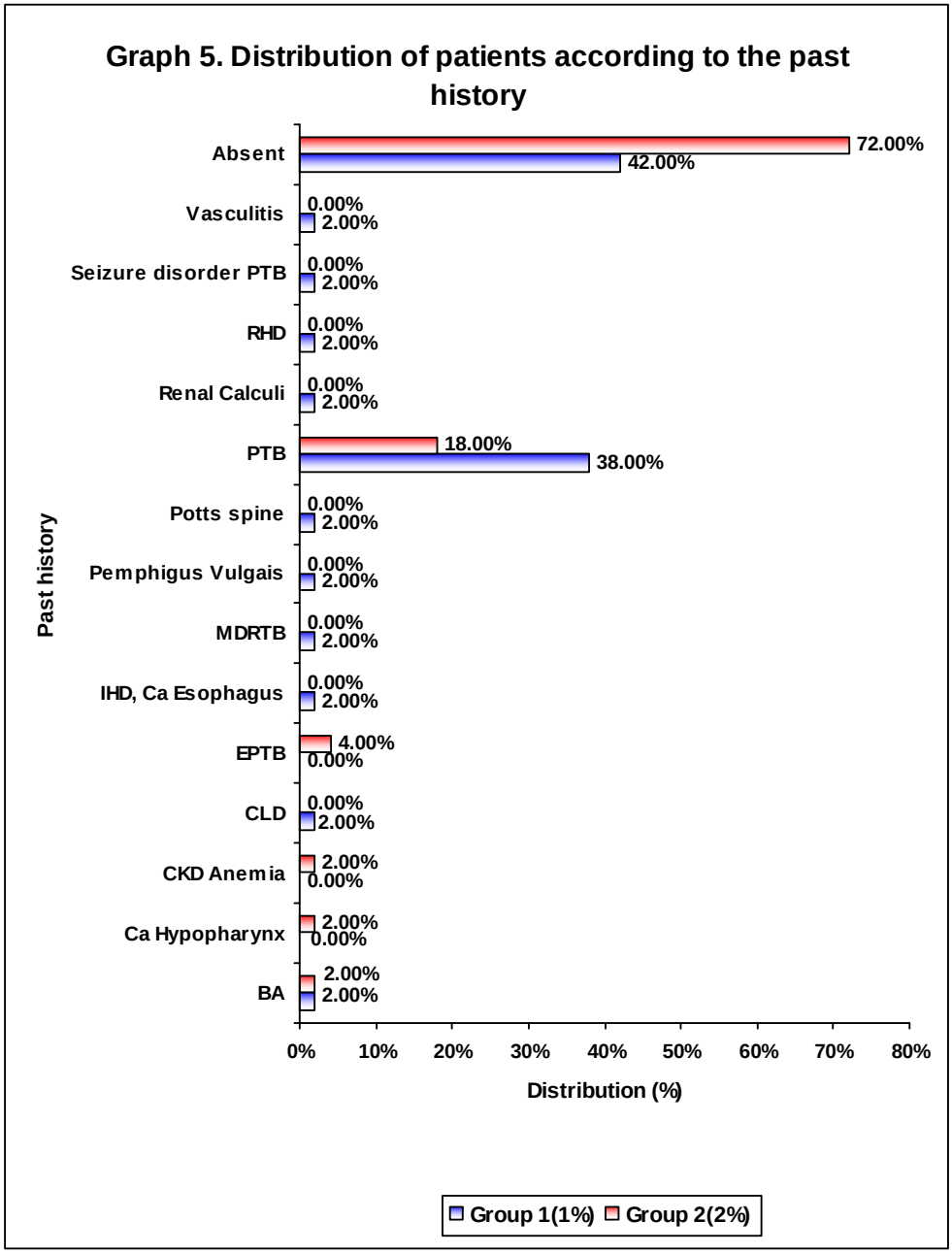


Table 7 & Graph 5 provides a comparison of the past medical history of patients across two groups. Pulmonary tuberculosis (PTB) stands out as the most common past medical condition in Group 1, affecting 38% of its participants, while it's less prevalent in Group 2, affecting 18%. The absence of past medical history is noted in 42% of Group 1 and is significantly higher in Group 2 at 72%. Other conditions

such as bronchial asthma (BA), cancer of the hypopharynx (Ca Hypopharynx), chronic kidney disease with anaemia (CKD Anaemia), chronic liver disease (CLD), extrapulmonary TB (EPTB), ischemic heart disease with oesophageal cancer (IHD, Ca Esophagus), multidrug-resistant TB (MDRTB), pemphigus vulgaris, Pott's spine, renal calculi, rheumatic heart disease (RHD), and seizure disorder with PTB are present in minimal percentages (2% or 4%) in either group. Vasculitis is present in 2% of Group 1 but not in Group 2.

Table 8. Comparison of surgical history

Surgical history	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
Present	8	16.00	6	12.00
Absent	42	84.00	44	88.00
Total	**50**	**100.00**	**50**	**100.00**

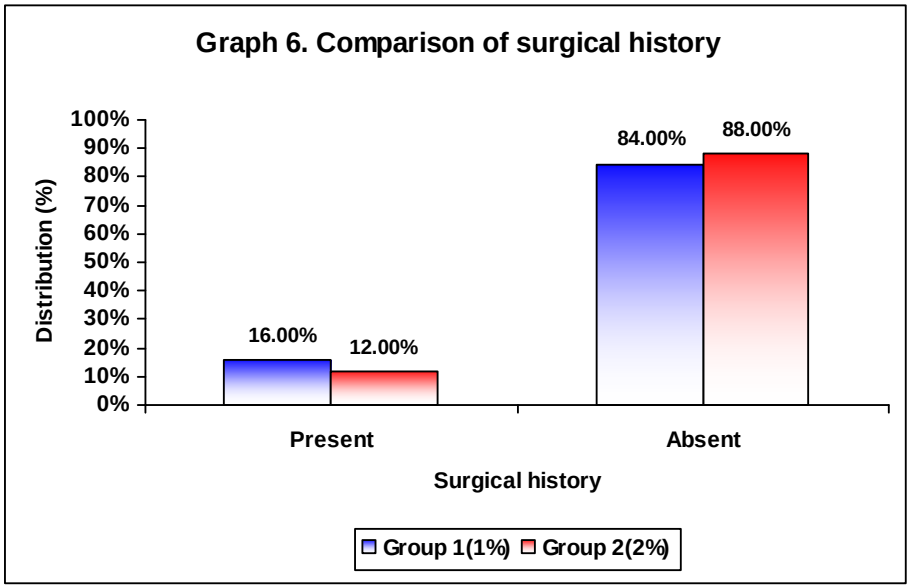


Table 8 & Graph 6. Depicts the comparison of surgical history between Group 1 and Group 2. 16 percent of patients report a history of surgery, while the remaining 84 percent have no such history. In comparison, Group 2, only 12 percent, with a surgical history and 88 percent, without any surgical past history.

Table 9. Comparison of smoking history

Smoking history	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
Smoker	30	60.00	26	52.00
Non smoker	20	40.00	24	48.00
Total	**50**	**100.00**	**50**	**100.00**

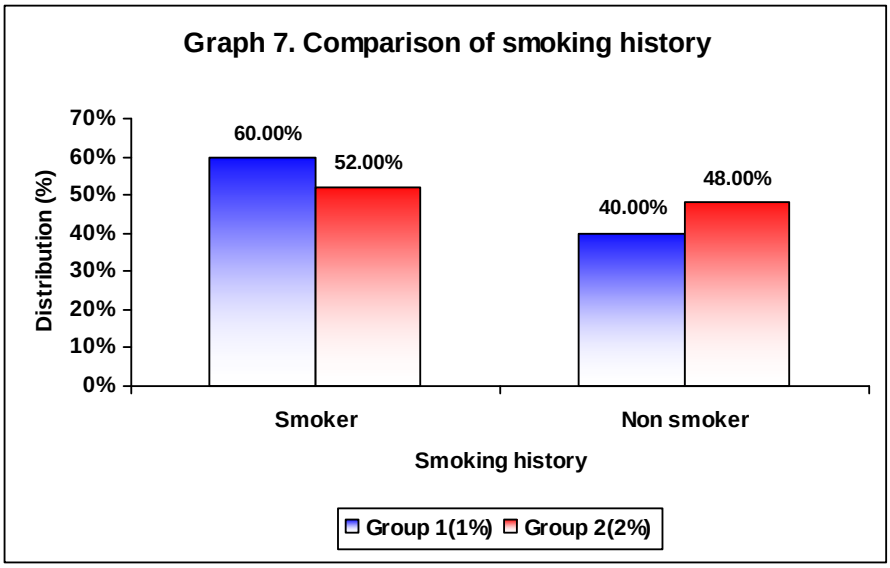


Table 9 & Graph 7. Shows the comparison of smoking history between Group 1 and Group 2. In Group 1, 60 percent of participants are identified as smokers. Conversely, Group 2 shows a slightly lower percentage of smokers at 52 percent. Non-smokers make up 40 percent of Group 1 and a close 48 percent of Group 2. The graph illustrates that both groups have a significant proportion of smokers, with Group 1 having a marginally higher prevalence.

Table 10 Comparison of allergic history

Allergic history	Group 1		Group 2	
	Number	**Percentage**	**Number**	**Percentage**
Dust allergy	6	12.00	11	22.00
Drug Allergy	0	0	0	0
Absent	44	88.00	39	78.00
Total	**50**	**100.00**	**50**	**100.00**

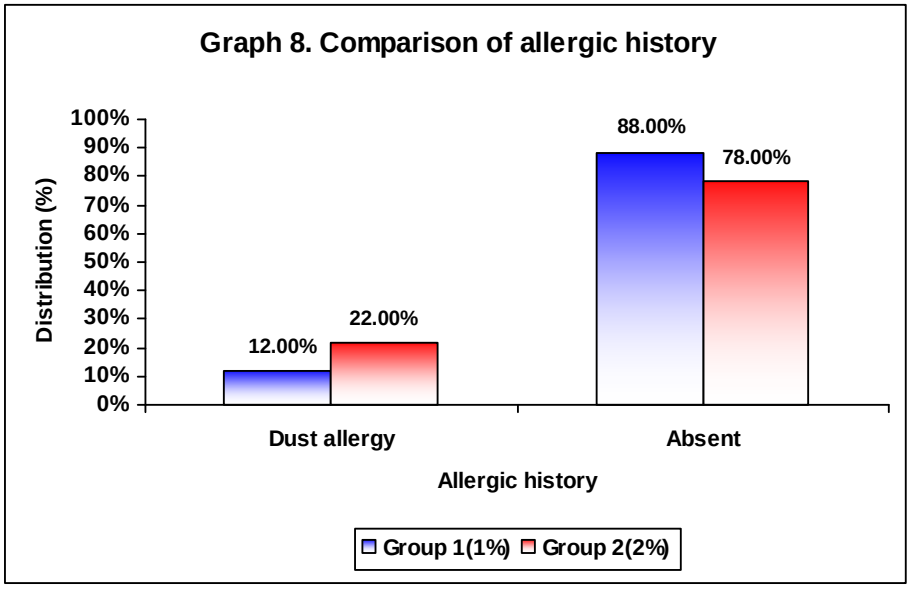


Table 10 & Graph 8. Illustrates the distribution of allergic history among patients in two study groups. Group 1 shows that 12 percent of its participants have a history of dust allergy, whereas a notably larger 22 percent of Group 2 report having a dust allergy. The proportion of participants without any allergic history is higher in Group 1, with 88 percent reporting the absence of allergies, compared to 78 percent in Group 2.

Table 11. Comparison of haemodynamic parameters - pulse rate

Intervals	Pulse rate (per minute)				p value
	Group 1(1%) (n=50)		Group 2(2%)(n=50)		
	Mean	SD	Mean	SD	
Before procedure	92.80	13.04	90.72	10.61	0.384
During procedure	109.12	17.27	114.80	13.97	0.074
After procedure	100.40	12.21	104.46	10.59	0.079
While passing through larynx	109.28	16.66	114.88	13.97	0.072
While suctioning	109.20	16.35	115.96	14.33	0.030

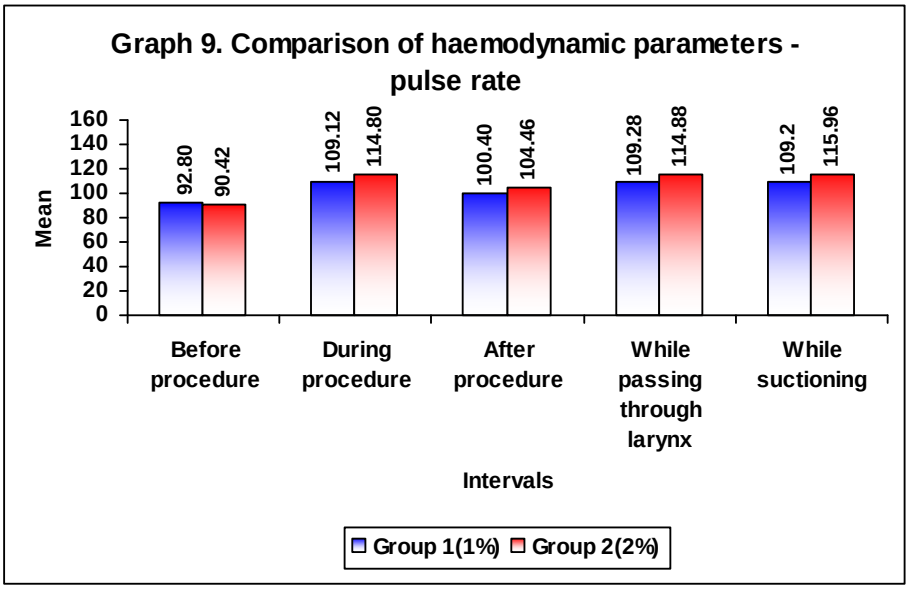


Table 11 & Graph 9. Provides a comparison of haemodynamic parameters, specifically the pulse rate, measured at different intervals during a procedure between Group 1 and Group 2. Both groups consisted of 50 patients each. Before the procedure, Group 1 had a mean pulse rate of 92.80 beats per minute with a standard deviation of 13.04, indicating some variability around the mean. Group 2 had a slightly lower mean pulse rate of 90.72 with a standard deviation of 10.61. The difference in pulse rates before the procedure was not statistically significant, with a p-value of 0.384. During the procedure, the mean pulse rate for Group 1 was 109.12, while Group 2 had a higher mean pulse rate of 114.80. The difference started to become narrower as indicated by a p-value of 0.074. After the procedure, Group 1's mean pulse rate slightly decreased to 100.40, whereas Group 2's was 104.46. This post-procedure difference also had a low p-value of 0.079, indicating a trend towards significance but still not reaching conventional levels. When passing through the larynx, Group 1's mean pulse rate was 109.28, compared to Group 2's 114.88. The p-value here was 0.072, showing again a trend without reaching statistical significance. The only interval where the mean pulse rates were statistically different was while suctioning. Group 1 had a mean pulse rate of 109.20, and Group 2 had a higher mean pulse rate of 115.96, with the p-value reaching 0.030, which is less than the conventional threshold of 0.05 for statistical significance. The data suggests that while the groups have similar pulse rates at the start, Group 2 tends to have a higher pulse rate during stressful intervals of the procedure, with the only statistically significant difference occurring during suctioning.

Table 12. Comparison of haemodynamic parameters - systolic blood pressure

Intervals	Systolic blood pressure (mm Hg)				p value
	Group 1(1%)(n=50)		Group 2(2%) (n=50)		
	Median	IQR	Median	IQR	
Before procedure	120.00	11.50	120.00	12.50	0.708
During procedure	124.00	12.50	130.00	17.00	0.342
After procedure	120.00	11.00	130.00	11.00	0.356
While passing through larynx	124.00	12.50	130.00	12.50	0.385
While suctioning	130.00	12.50	130.00	20.00	0.366

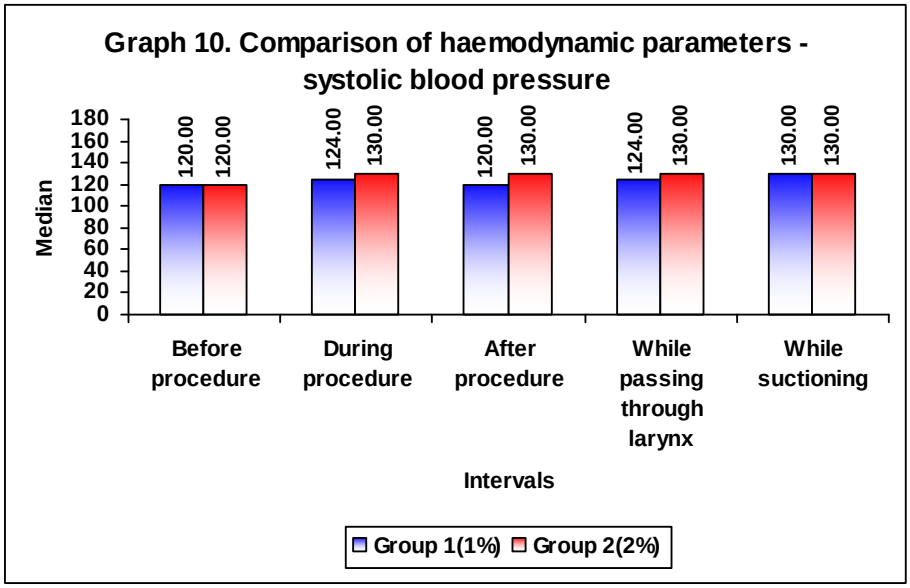


Table 12 & Graph 10. Focuses on the median systolic blood pressure (SBP) readings at various intervals for patients in Group 1 and Group 2, each consisting of 50 patients, along with the interquartile range (IQR) which measures the spread of the middle 50 percent of the values. Before the procedure, both groups have an identical median SBP of 120 mm Hg, though Group 2 has a slightly wider IQR at 12.50 compared to Group 1's 11.50, indicating a greater spread of values in Group 2. The p-value of 0.708 suggests no significant difference between the groups at this stage. During the procedure, Group 1 has a median SBP of 124 mm Hg with an IQR of 12.50, while Group 2 shows a higher median SBP of 130 mm Hg with a wider IQR of 17.00, suggesting more variability. The difference, however, is not statistically significant (p-value of 0.342). After the procedure, Group 1's median SBP returns to 120 mm Hg with an IQR of 11.00, and Group 2's median increases to 130 mm Hg with the same IQR of 11.00. Again, the p-value of 0.356 indicates no significant difference. While passing through the larynx and during suctioning, both groups show a median SBP of 130 mm Hg. However, Group 2 maintains a wider IQR, especially while suctioning (20.00 compared to Group 1's 12.50), indicating a greater variability among Group 2's patients. The p-values for these intervals (0.385 and 0.366, respectively) suggest that these observed differences are not statistically significant. The graph demonstrates that while Group 2 generally exhibits higher SBP during the procedure, both groups converge to a similar median SBP level during the most stressful parts.

Table 13. Comparison of haemodynamic parameters - diastolic blood pressure

Intervals	Diastolic blood pressure (mm Hg)				p value
	Group 1(1%) (n=50)		Group 2(2%) (n=50)		
	Median	IQR	Median	IQR	
Before procedure	80.00	10.00	80.00	10.00	0.680
During procedure	80.00	10.00	80.00	1.50	0.168
After procedure	80.00	10.00	80.00	10.00	0.369
While passing through larynx	80.00	10.00	80.00	1.50	0.195
While suctioning	80.00	10.00	80.00	2.50	0.220

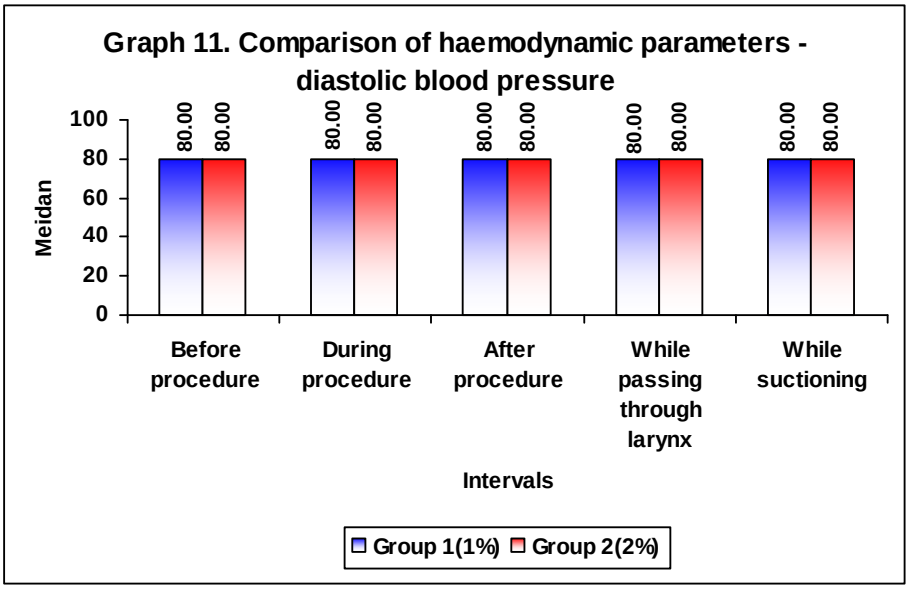


Table 13 & Graph 11. Presents the median diastolic blood pressure (DBP) and interquartile range (IQR) measurements for Group 1 and Group 2 at different intervals during a medical procedure. Both groups exhibit identical median DBP values of 80 mm Hg before the procedure, with an IQR of 10 mm Hg, indicating similar variability within both groups. The p-value of 0.680 confirms that this similarity is not due to chance. During the procedure, while both groups maintain the same median DBP of 80 mm Hg, Group 2 shows a considerably narrower IQR of 1.50 mm Hg compared to Group 1's IQR of 10 mm Hg, suggesting less variability in Group 2's measurements. Despite this difference in variability, the p-value of 0.168 does not indicate a statistically significant difference. After the procedure and while passing through the larynx, both groups continue to show a median DBP of 80 mm Hg with Group 1 maintaining an IQR of 10 mm Hg. Group 2's IQR narrows further during larynx passage to 1.50 mm Hg. The p-values here, 0.369 and 0.195 respectively, suggest no significant difference between the groups at these stages. While suctioning, the median DBP for both groups remains steady at 80 mm Hg. Group 1 has an IQR of 10 mm Hg, and Group 2 has an IQR of 2.50 mm Hg. Again, the p-value of 0.220 indicates that this difference in IQR is not statistically significant. Overall, throughout all intervals, both groups exhibit the same median DBP. Although there is a notable difference in the IQR values—particularly during the procedure which implies more variability in Group 1—the p-values suggest that these differences do not reach statistical significance. This consistency in median DBP values across both groups suggests that, in terms of diastolic blood pressure, the groups are hemodynamically similar across the various procedural stages.

Table 14. Comparison of haemodynamic parameters - respiratory rate

Intervals	Respiratory rate (per minute)				p value
	Group 1(1%) (n=50)		Group 2(2%) (n=50)		
	Median	IQR	Median	IQR	
Before procedure	20.50	2.00	22.00	4.00	**0.025**
During procedure	26.00	4.00	28.00	2.00	0.108
After procedure	24.00	3.25	26.00	4.00	**0.005**
While passing through larynx	26.00	4.00	28.00	2.00	**0.001**
While suctioning	26.00	4.00	28.00	2.00	**0.001**

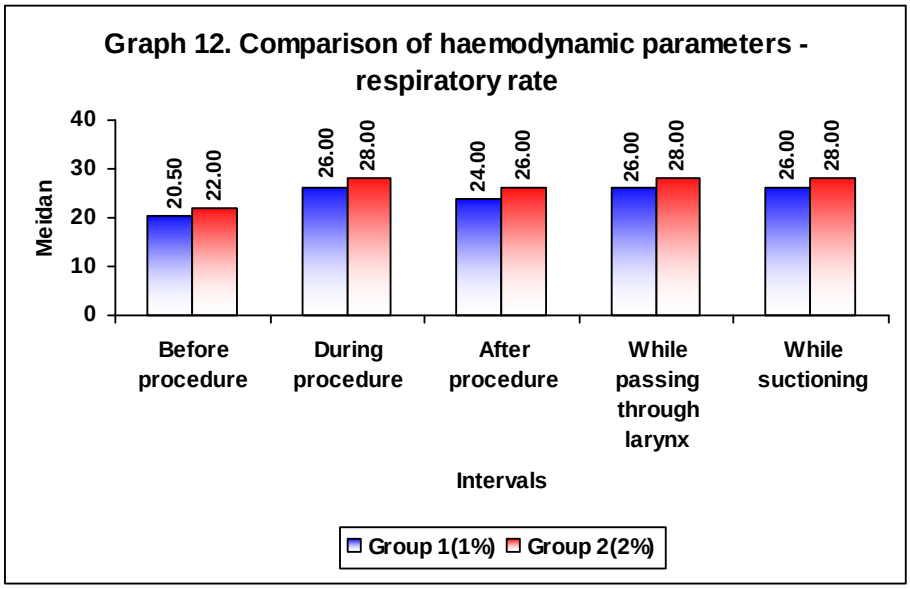


Table 14 and Graph 12. Examines the respiratory rate (RR) across different stages of a procedure for patients in Group 1 and Group 2, each with 50 individuals. Before the procedure, Group 1 has a median RR of 20.50 breaths per minute with a narrow interquartile range (IQR) of 2.00, indicating less variability among patients. Group 2 has a slightly higher median RR of 22.00 breaths per minute with an IQR of 4.00, suggesting more variability. The difference in respiratory rates at this stage is statistically significant with a p-value of 0.025. During the procedure, Group 1's median RR rises to 26.00 breaths per minute, while Group 2's median is higher at 28.00. However, the p-value of 0.108 indicates that this difference is not statistically significant. After the procedure, Group 1 has a median RR of 24.00 breaths per minute, and Group 2 has a median of 26.00. At this point, the p-value is 0.005, which is statistically significant, suggesting a meaningful difference in the RR between the groups after the procedure. While passing through the larynx and while suctioning, both groups show an increase in median RR—Group 1 to 26.00 and Group 2 to 28.00 breaths per minute. These differences are statistically significant with a p-value of 0.001 for both intervals, indicating that Group 2 maintains a higher RR during these more invasive parts of the procedure.

Table 15. Comparison of requirement of oxygen

Intervals	Group 1(1%) (n=50)		Group 2(2%) (n=50)		p value
	Number	Percentage	Number	Percentage	
Before procedure	8	16.00	8	16.00	1.000
During procedure	25	50.00	38	76.00	**0.006**
After procedure	19	38.00	23	46.00	0.544
While passing through larynx	25	50.00	38	76.00	**0.006**
While suctioning	26	52.00	38	76.00	**0.011**

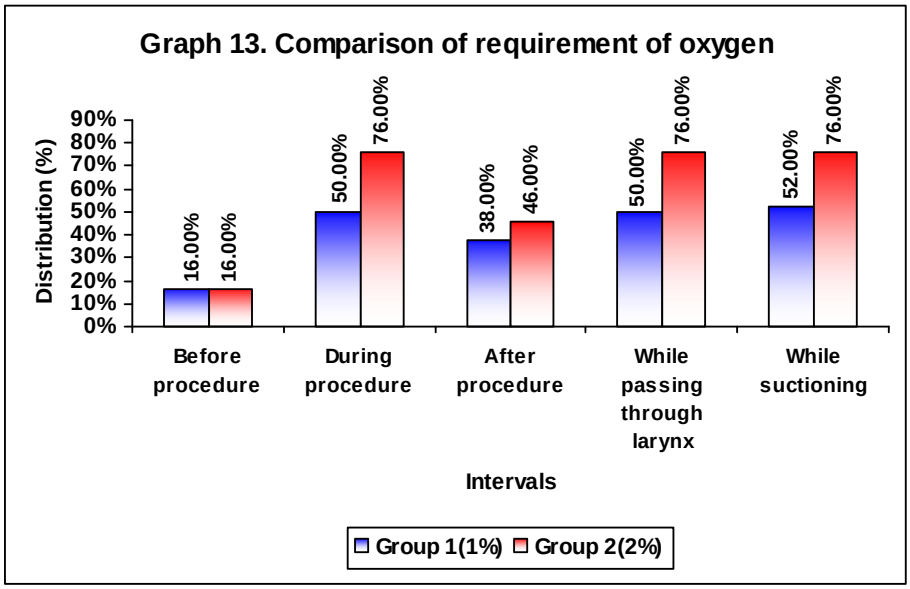


Table 15 & Graph 13. Showcases the comparison of oxygen requirements between Group 1 and Group 2 during various intervals of this procedure. Initially, before the procedure, both groups have the same level of oxygen requirement, with 16% of patients in each group requiring supplemental oxygen. However, as the procedure commences, a notable divergence occurs. During the procedure, Group 2 rises significantly with p value of 0.006, indicating that 76% of these patients require oxygen, in contrast to 50% in Group 1. This trend continues with similar patterns observed while passing through the larynx and while suctioning, where Group 2 has consistently higher oxygen requirements (76% for both intervals) than Group 1 (50% for both intervals) with statistically significant p values of 0.006 and 0.011 respectively.

Table 16. Comparison of haemodynamic parameters -Oxygen requirement

Intervals	Oxygen requirement (L/min)						p value
	Group 1 (1%)			Group 2(2%)			
	n	Median	IQR	n	Median	IQR	
Before procedure	8	2.00	1.35	8	3.00	2.00	0.539
During procedure	25	4.00	2.00	38	3.50	3.00	0.514
After procedure	19	2.00	2.00	23	2.00	2.00	0.926
While passing through larynx	25	4.00	2.00	38	4.00	3.00	0.651
While suctioning	26	3.00	3.00	38	3.50	3.00	0.840

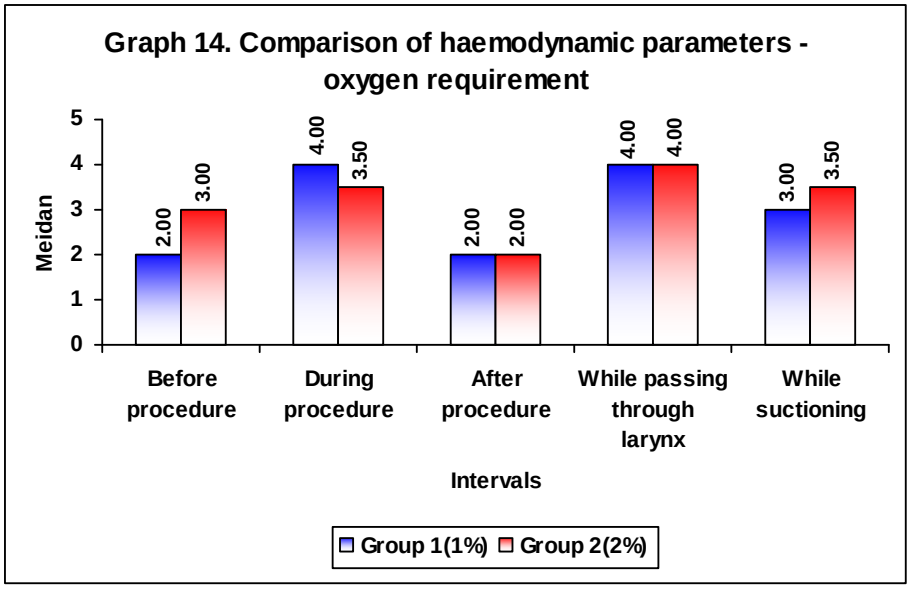


Table 16 and Graph 14. Compares the oxygen requirements of patients in Group 1 and Group 2 during various stages of a medical procedure. The table provides the number of patients who required oxygen, their median oxygen requirements in liters/min (L/min), and the interquartile range (IQR) which measures the variability around the median. Before the procedure, 8 patients in both groups needed supplemental oxygen, with a median requirement of 2.00 L for Group 1 (IQR of 1.35 L) and a slightly higher median requirement of 3.00 L for Group 2 (IQR of 2.00 L). The p-value of 0.539 suggests no significant difference in oxygen requirements between the two groups at this interval. During the procedure, a higher number of patients in Group 2 (38) required oxygen compared to Group 1 (25), yet the median requirement for Group 1 was 4.00 L (IQR of 2.00 L) compared to a slightly lower median of 3.50 L for Group 2 (IQR of 3.00 L). Despite the difference in the number of patients requiring oxygen, the p-value of 0.514 indicates no significant difference in the amount of oxygen required. After the procedure, the median oxygen requirement was 2.00 L with an IQR of 2.00 L for both groups, reflecting exactly the same oxygen needs among those who required it. The p-value of 0.926 reinforces that there is no statistical difference in oxygen requirements post-procedure. While passing through the larynx, both groups had a median oxygen requirement of 4.00 L, with Group 1 showing an IQR of 2.00 L and Group 2 a slightly higher IQR of 3.00 L, indicating more variability. However, this difference is not statistically significant (p-value of 0.651). While suctioning, Group 1's median oxygen requirement was 3.00 L (IQR of 3.00 L), with Group 2 requiring a median of 3.50 L (IQR of 3.00 L). Again, there is no significant difference between the groups (p-value of 0.840).

Table 17. Comparison of haemodynamic parameters -Oxygen saturation (No Oxygen requirement at time of procedure)

Intervals	Oxygen saturation (%)				p value
	Group 1(1%) (n=50)		Group 2 (2%)(n=50)		
	Median	IQR	Median	IQR	
Before procedure	98.00	2.00	98.00	2.00	0.919
During procedure	98.00	4.00	98.00	3.00	0.826
After procedure	97.50	2.25	98.00	2.25	0.881
While passing through larynx	98.00	4.00	98.00	3.00	0.843
While suctioning	98.00	4.00	98.00	3.00	0.667

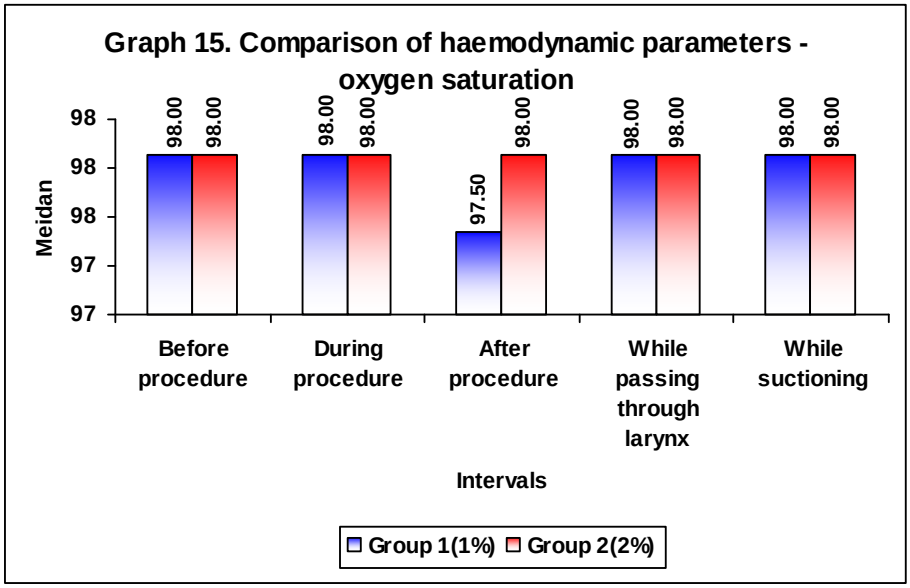


Table 17 & Graph 15. Compares the median oxygen saturation levels and their variability, as measured by the interquartile range (IQR), for Group 1 and Group 2 at different stages of the procedure. The median oxygen saturation for both groups before the procedure is at 98%, with an IQR of 2%, indicating similar central tendency and variability. During the procedure, the median remains unchanged for both groups, but Group 1 has a slightly higher IQR at 4%, compared to Group 2's IQR of 3%, suggesting a slightly wider variation in Group 1. After the procedure, Group 1's median oxygen saturation drops slightly to 97.50%, while Group 2's median remains at 98%. The IQR for both groups is 2.25%, showing that the spread of measurements around the median is similar. While passing through the larynx and while suctioning, both groups maintain a median oxygen saturation of 98%, with Group 1 having a wider spread of values (IQR of 4%) compared to Group 2 (IQR of 3%). Across all intervals, the p-values shows there are no statistically significant differences between the two groups in terms of median oxygen saturation or variability at these stages of the procedure.

Table 18. Comparison of post procedure clinical data

Parameters	Group 1(1%) (n=50)		Group 2 (2%) (n=50)		P value
	Median	IQR	Median	IQR	
CSS by Bronchoscopist	20.00	5.00	20.00	6.25	0.281
CSS by Patient	20.00	5.00	20.00	10.00	0.423
Cough count by Investigator	18.00	13.00	20.00	19.25	**0.013**
Lignocaine dose(mg)	106.50	0.00	213.00	0.00	**<0.001**
VAS pain Bronchoscopist	1.00	0.00	1.00	0.00	0.813
VAS pain patient	1.00	1.00	1.00	1.00	0.935

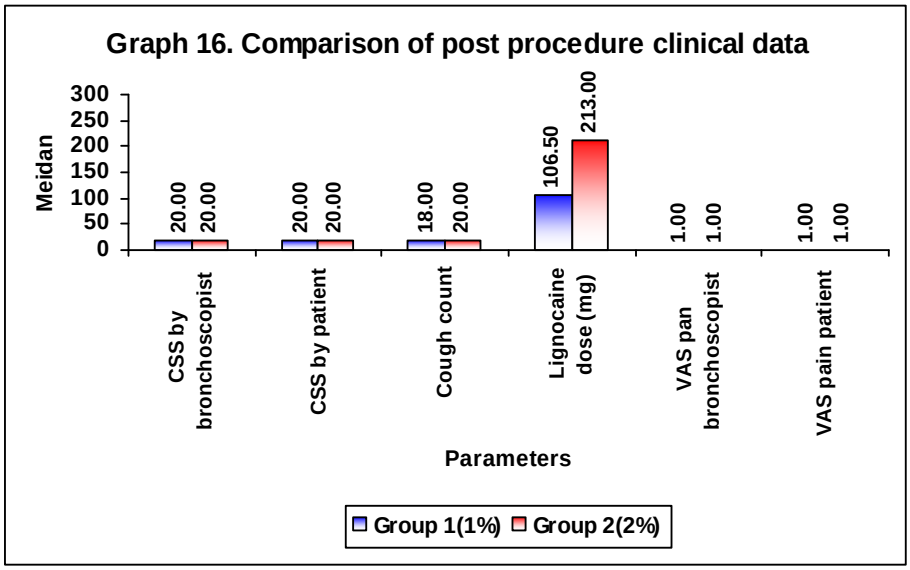


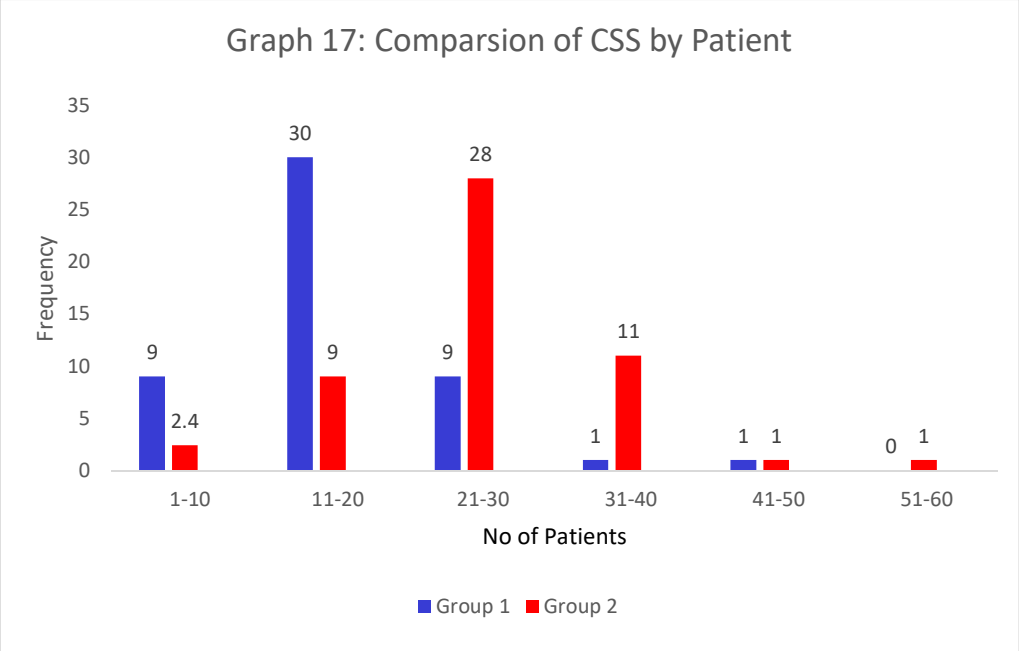
Table 18 & Graph 16. Provides a comparison of various post-procedure clinical data between Group 1 and Group 2, each consisting of 50 patients. For the Clinical Severity Score (CSS) rated by the bronchoscopist and by the patients themselves, both groups have an identical median score of 20.00. However, Group 2 exhibits a broader range of patient-rated CSS (IQR of 10.00) compared to the bronchoscopist-rated CSS (IQR of 6.25), suggesting greater variability in patients' perceived severity. Despite this variability, the p-values indicate no significant difference in CSS between the groups (0.281 for bronchoscopist-rated and 0.423 for patient-rated). The median cough count by investigator is slightly higher in Group 2 (20.00) with a greater spread of data (IQR of 19.25) compared to Group 1 (median of 18.00, IQR of 13.00), and this difference is statistically significant (p-value of 0.013), suggesting more coughing in Group 2. The lignocaine dose shows a notable difference, with Group 1 receiving a median dose of 106.50 mg and Group 2 receiving a significantly higher median dose of 213.00 mg. This is statistically significant (p-value <0.001), indicating a substantial difference in anaesthesia management between the groups. Lastly, the Visual Analogue Scale (VAS) for pain assessed by both the bronchoscopist and the patients revealed a median score of 1.00 for both groups with narrow IQRs, indicating similar pain experiences across groups. The p-values (0.813 for bronchoscopist-rated and 0.935 for patient-rated) reinforce that there is no significant difference in pain perception between the groups post-procedure.

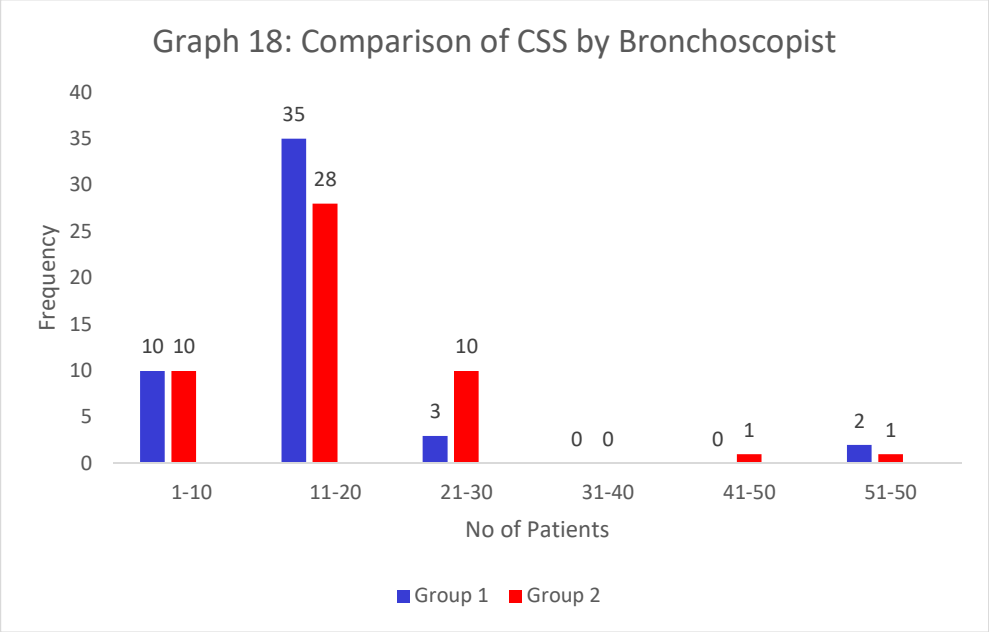
Table 19. Comparison of frequency distribution of CSS by patient, CSS by Bronchoscopist, Cough count by Investigator

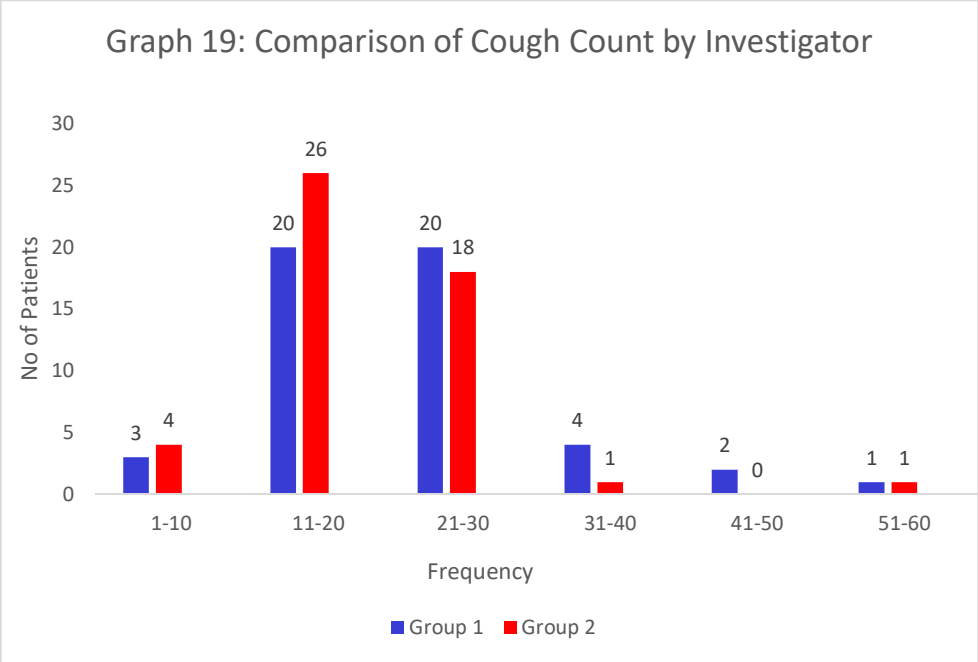
Frequency	CSS by Bronchoscopist		CSS by Patient		Cough Count by Investigator	
	Group 1 (1%)	Group 2 (2%)	Group 1 (1%)	Group 2 (2%)	Group 1 (1%)	Group 2 (2%)
0-10	10	10	9	9	3	4
11-20	35	28	30	28	20	26
21-30	3	10	9	11	20	18
31-40	0	0	1	0	4	1
41-50	0	1	1	1	2	0
51-60	2	1	0	1	1	1

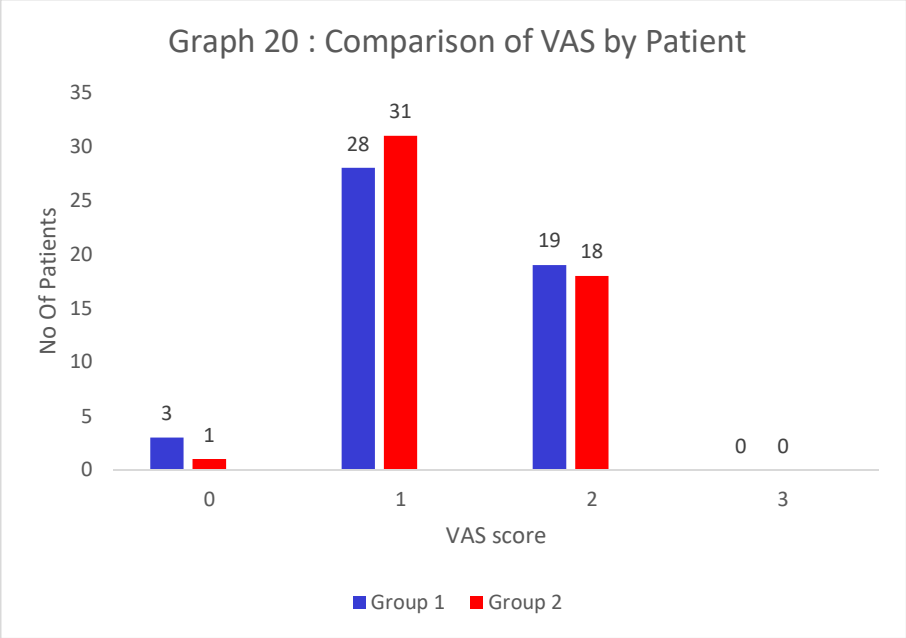
Table 20: Comparison of frequency distribution of VAS by patient, VAS by Bronchoscopist

VAS	By Bronchoscopist		By Patient	
	Group 1 (1%)	Group 2 (2%)	Group 1 (1%)	Group 2 (2%)
0	8	7	3	1
1	32	40	28	31
2	4	3	19	18
3	0	0	0	0




Graph 18: Comparison of CSS by Bronchoscopist
Frequency
40
35
30
25
20
15
10
5
0
10 10
35
28
3
10
0 0
0 1
2 1
1-10
11-20
21-30
31-40
41-50
51-50
No of Patients
Group 1
Group 2


Graph 19: Comparison of Cough Count by Investigator
No of Patients
30
25
20
15
10
5
0
3 4
20
26
20
18
4 1
2 0
1 1
1-10
11-20
21-30
31-40
41-50
51-60
Frequency
Group 1
Group 2


Graph 20 : Comparison of VAS by Patient
No Of Patients
35
30
25
20
15
10
5
0
3
1
28
31
19
18
0
0
0
1
2
3
VAS score
Group 1
Group 2

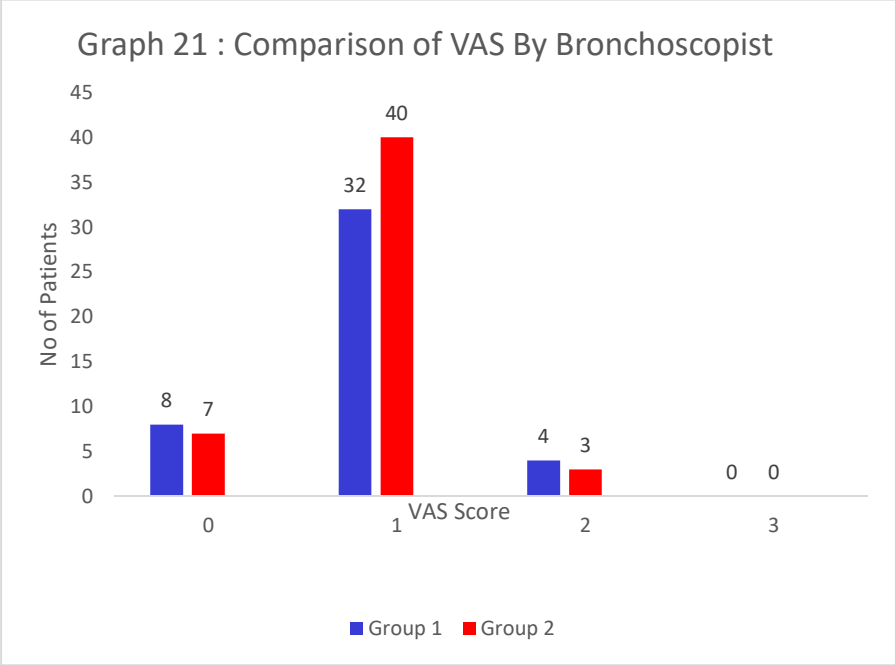

Graph 21 : Comparison of VAS By Bronchoscopist
No of Patients
45
40
35
30
25
20
15
10
5
0
8
7
32
40
4
3
0
0
0
1
2
3
VAS Score
Group 1
Group 2

Table 21. Comparison of sedation

Sedation	Group 1(1%)		Group 2(2%)	
	Number	**Percentage**	**Number**	**Percentage**
Fentanyl only	42	84.00	43	86.00
Fentanyl with Midazolam	7	14.00	7	14.00
Not required	1	2.00	0	0.00
Total	**50**	**100.00**	**50**	**100.00**

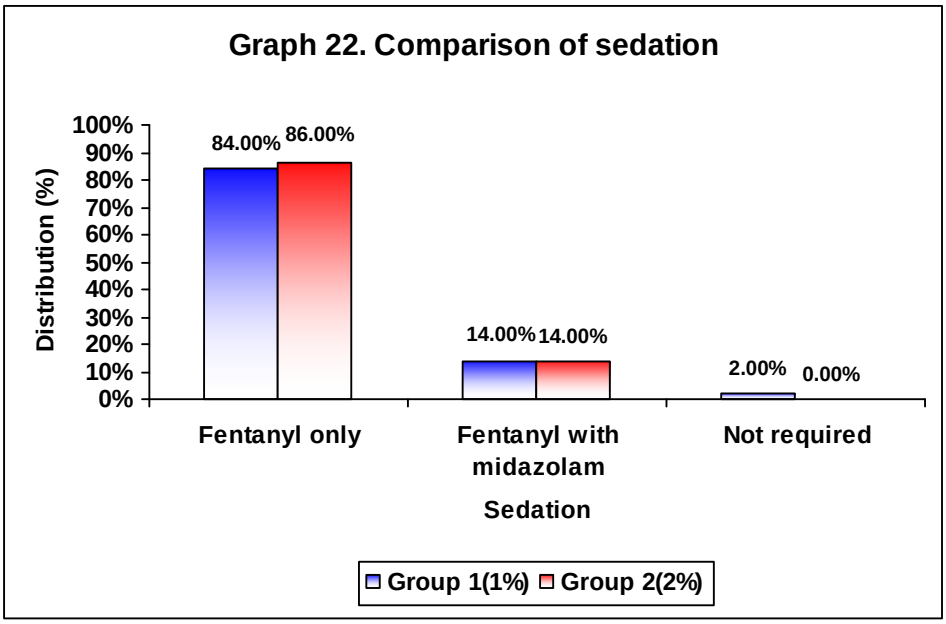


Table 21 & Graph 22. Compares the use of sedation methods between Group 1 and Group 2 during a procedure. The majority of both groups received Fentanyl as the only sedative, with 84% in Group 1 and 86% in Group 2. A smaller, identical percentage of patients in both groups (14%) received a combination of Fentanyl with Midazolam, suggesting a standard approach to sedation across the groups. In Group 1, there is a single case (2%) where no sedation was required, while in Group 2, all patients required some form of sedation.

Table 22. Comparison of side effects of Lignocaine

Complications	Group 1(1%)		Group 2(2%)		p value
	Number	Percentage	Number	Percentage	
Present	15	30.00	38	76.00	**< 0.001**
Absent	35	70.00	12	24.00	
Total	**50**	**100.00**	**50**	**100.00**	

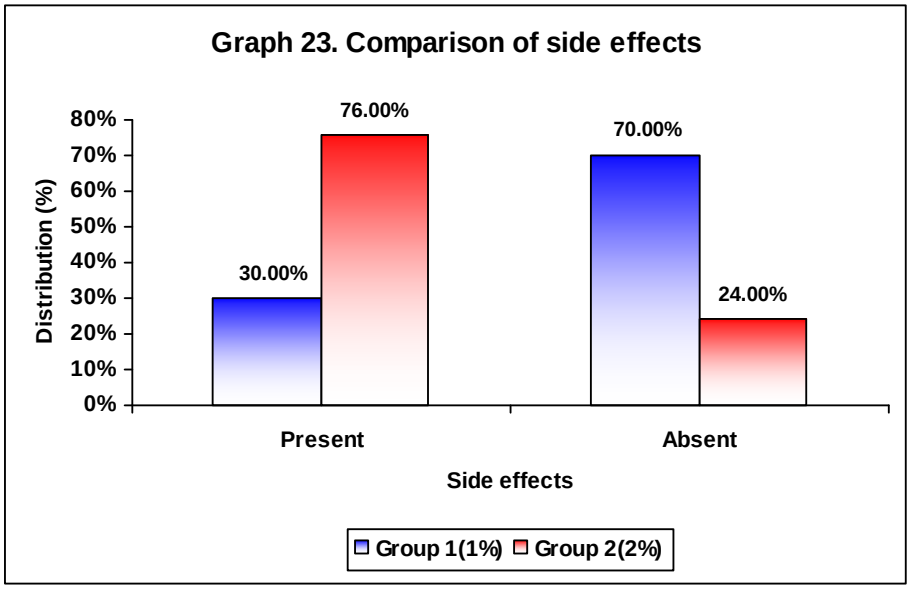


Table 22 & Graph23. Explains the occurrence of side effects of lignocaine in Group 1 and Group 2 following a procedure. In Group 1, side effects were present in 30% of the patients, whereas 76% of patients in Group 2 experienced side effects. Conversely, a majority of 70% in Group 1 did not experience any side effects post-procedure, compared to only 24% in Group 2. The values were statistically significant $p<0.001$

Table 23. Distribution of patients according to side effects of Lignocaine

Side Effects	Group 1(1%)		Group 2(2%)		p value
	Number	Percentage	Number	Percentage	
Bronchospasm	14	28.00	37	74.00	**<0.001**
Cough	1	2.00	0	0.00	0.500
Involuntary hand and leg movement	0	0.00	1	2.00	0.500
Absent	35	70.00	12	24.00	
Total	**50**	**100.00**	**50**	**100.00**	

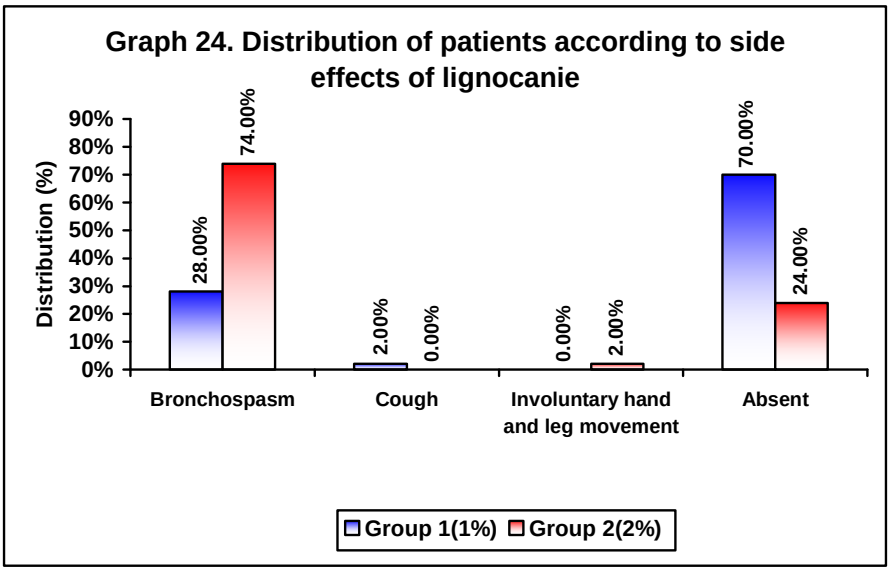


Table 23 & Graph 24. Outlines the specific side effects experienced by patients in Group 1 and Group 2 following a procedure. In Group 1, bronchospasm was the predominant side effect, occurring in 28% of patients, while cough was reported by only 2% of the group, and there were no instances of involuntary hand and leg movements. The majority of Group 1, 70%, did not experience any side effects. In contrast, Group 2 had a significantly higher incidence of bronchospasm at 74%, did not report any cases of cough, and 1 patient experienced involuntary hand and leg movements. In Group 2, 24% were not having side effect. Bronchospasm was statistically significant in Group 2 with p value < 0.001.

Table 24. Comparison of BAL Culture Sensitivity

BAL	Group 1(1%)		Group 2(2%)		p value
	Number	Percentage	Number	Percentage	
Growth	23	46.00	16	32.00	0.218
No growth	27	54.00	34	68.00	
Total	**50**	**100.00**	**50**	**100.00**	

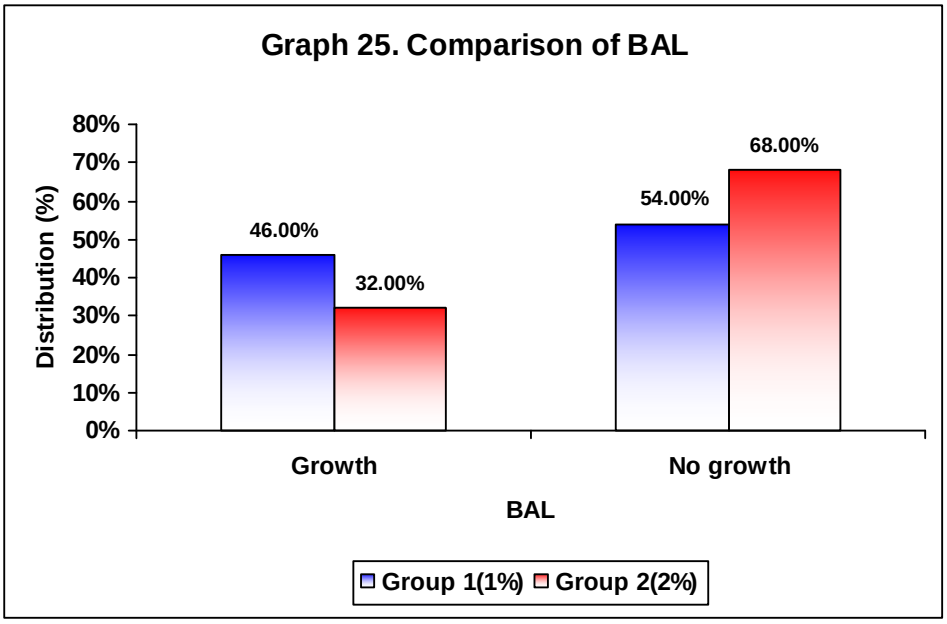


Table 24 & Graph 24. Compares the outcomes of bronchoalveolar lavage (BAL) culture between Group 1 and Group 2. In Group 1, 46% of the patients had growth in their BAL cultures, whereas 54% showed no growth. Group 2 had a lower percentage of growth at 32%, with a higher percentage of 68% showing no growth. The p-value of 0.218 indicates that the difference in growth rates between the two groups is not statistically significant.

DISCUSSION

This study aims to know the difference between 1% and 2% lignocaine (local anesthetic) agent during the bronchoscopy procedure. After studying about 50 patients in each group respectively, the study highlights about the significance of the dosage of local anesthetic agent lignocaine along with that how it affects procedure. This study also gives emphasis on the effect of these agents on patients during the procedure.

The study highlights a detailed investigation into the haemodynamic and respiratory responses during bronchoscopy, a significant diagnostic and therapeutic tool in respiratory medicine. The comprehensive analysis encompassed a wide array of parameters, including pulse rate, blood pressure, respiratory rate, and oxygen saturation across two distinct patient groups, providing a view of physiological changes during bronchoscopy. Notably, the results revealed significant variations in respiratory rate and systolic blood pressure at different stages of the procedure, underscoring the dynamic nature of patient responses during bronchoscopy. These findings are instrumental in enhancing our understanding of the procedural impact on patients and hold significant implications for the clinical management and monitoring strategies during bronchoscopy.

In study by Madan et al five hundred consecutive patients undergoing bronchoscopy were randomized to receive either a 1% or 2% lignocaine solution using the spray-as-you-go technique without receiving lignocaine nebulisation. In comparing the present study's findings with those of Madan K et al., several similarities and differences arise, highlighting the nuanced effects of lignocaine concentration on haemodynamic and respiratory parameters during bronchoscopy.

Both studies showcase a consistent trend in maintaining comparable baseline characteristics such as age, weight, and baseline vital signs, with no statistically significant differences in these demographics. However, the current study demonstrates a noteworthy divergence in parameters such as the height and Body Mass Index (BMI) of the participants. Particularly, the mean height in the current study's 1% lignocaine group showed a statistically significant difference compared to Madan K et al.'s findings, suggesting that patient stature may influence procedural responses. Furthermore, while Madan K et al. did not report a significant difference in systolic and diastolic blood pressure during bronchoscopic procedures, the present study observed that these pressures varied at different procedural stages, potentially indicating a dose-dependent response to lignocaine. The variability in respiratory rates during the procedure also contrasts with the earlier study, with present study findings indicating a heightened respiratory response in the higher lignocaine concentration group. These differences could reflect advancements in procedural techniques or patient management, as well as variations in the study populations, which may have evolved over time. Additionally, the current study's use of two different lignocaine concentrations provides valuable insights into the dose-dependent effects of local anesthetics on patient comfort and physiological responses during bronchoscopy.[9]

In the current study, Group 1 with males comprising 66 percent in and 56 percent in Group 2, while females accounted for 34 percent and 44 percent, respectively.in this study gender distribution was comparable with other studies while few studies showed difference in gender distribution like Dhooria et al where higher prevalence of male patients where present leading to selection bias.[3]

In the present study, the age median stands at 50 years with a range of 40 to 60 for the 1% lignocaine group and 52 years with a range of 38 to 61 for the 2% lignocaine group The lack of statistical significance in the current study's age distribution, with a p-value of 0.710, contrasts with the broader spread in Kaur H. et al.'s findings, with their p-value of 0.496 indicating no significant difference across a more diverse age range. The age distribution in the present study is similar to that in the other study.[36]

In the present study, the study group underwent various procedures like BAL, TBLB, TBNA. Bronchoalveolar Lavage (BAL) was the most common procedure, with a frequency of 82% in Group 1 and 72% in Group 2. Transbronchial Lung Biopsy (TBLB) and BAL were performed together in 16% of cases in Group 1 and 28% in Group 2, indicating a higher rate of combined procedures in Group 2. Transbronchial Needle Aspiration (TBNA) with BAL occurred in 2% of cases in Group 1 but not done in Group 2. This was comparable with studies done by Madan et al, Dhooria et al where BAL was the most common procedure performed.[9,3]

Comorbidities distribution in the present study, reveals a distinctive pattern regarding patient health profiles. In the current study, there was a noticeable presence of comorbidities, with 60 percent of Group 1 and 48 percent of Group 2 having one or more comorbid conditions. The current study reveals that hypertension (HTN) and type 2 diabetes mellitus (T2DM) are the most prevalent comorbidities, consistent across both groups at 10 percent and 16 percent, respectively. Ischemic heart disease (IHD) alone seems to be less common, observed in 2 percent of Group 2. T2DM is more in Group 2 that is 22% compared to Group 1 that is 8%. The current study's p-value of 0.316 which is statistically no different between two groups. However, the

detailed breakdown of comorbidities in the current study provides a clear depiction of the health conditions affecting the study participants, which is crucial for understanding potential impacts of the procedure on patients which requires special attention for the procedure with comorbidities. However it is found that, there is no statistically significant difference in dosage of lignocaine or VAS by bronchoscopist and patient with different comorbidities.

As per the review of Literature it is found that there is a direct correlation of use of lignocaine with bacteria growth in culture. The current study investigates the outcomes of BAL by examining the presence or absence of growth in BAL cultures. In Group 1, 46% of the patients had bacterial growth in their BAL cultures, while 54% showed no growth. Group 2 had a lower growth rate, with only 32% showing bacterial growth and 68% showing no growth. With a p-value of 0.218, the study indicates that there's no statistically significant difference in growth rates between the two groups. To compare this in a study by Samet et al[47] for the 2 % lignocaine on bronchial fluid bacteria culture in 130 cases showed no difference in culture results before and after use of 2 % lignocaine. In one more review study, conducted by Kaewjiaranai et al.[48], it was demonstrated that higher concentrations of lignocaine lead to greater bacterial growth inhibition because lignocaine at concentrations of 1-3% have notable antimicrobial properties. Though our study didn’t show any statistical difference in BAL c/s between both groups, greater percentage positivity was seen in 1% group (46%) compared to 2% group (32%).

In the current study, smoking history among participants undergoing bronchoscopy shows a similar distribution between Group 1 and Group 2, with smokers constituting 60% and 52%, respectively, the non-smoker group percentage is

almost similar. The p-value of 0.546 indicates that the difference in smoking history between the two groups is not statistically significant, suggesting that the smoking status of participants is balanced between the groups in this cohort. Patients who have smoking history often have reactive airways and may require different precautions to ensure comfort and safety during bronchoscopic interventions due to damage caused by smoking to the lungs.[49] Smokers are known to have increased cough reflex sensitivity, which could affect their tolerance to the procedure and potentially increase the need for sedation and local anaesthetics.[50] While Dreher's research indicates that nebulized lidocaine is associated with reduced dosages of both lidocaine and fentanyl compared to administration via syringe, which could suggest a strategy for managing smoker's cough during bronchoscopy, it is essential to consider whether the distribution method of lidocaine might be differentially effective in smokers compared to non-smokers.[6] Overall in current study does not show a significant difference in smoking history between groups, it underscores the importance of considering smoking status in the procedural planning for bronchoscopy, as smokers may exhibit heightened bronchial reactivity.

The comparison of height distributions between the current study and that of Prabhudev AM et al., in 2017, presents a compelling facet of patient demographics in clinical research.[51] In the current study, the mean heights for Group 1 and Group 2 were 165.58 cm and 163.80 cm, respectively, with relatively close standard deviations (SD), indicating a homogenous height distribution among participants. The p-value of 0.262 denotes no statistically significant difference between the two groups in terms of height. The slight discrepancies in height measurements between the two studies are within expected ranges, considering natural population height variations.[52] The close alignment in height distributions is noteworthy because it suggests that height, a

factor not typically associated with significant clinical variability in bronchoscopy, does not contribute majorly to the differences in patient response to the procedure.[53] Such uniformity in a physiological characteristic across studies indicates that the results could have broad applicability across populations with similar height profiles. Moreover, the normal distribution of height in Prabhudev AM et al.'s study compared to the slightly skewed distribution in the current study does not seem to present clinical significance, suggesting that the bronchoscopy procedures' outcomes and tolerability are not height-dependent.

When analysing the current study's haemodynamic parameters in relation to pulse rate and comparing these findings with those of Imran MM et al. from 2022[54], several observations come to the forefront. In the current study, the mean pulse rate before the procedure was slightly higher in Group 1 (92.80 beats per minute) compared to Group 2 (90.72 beats per minute), with a non-significant p-value (0.384), suggesting minimal clinical difference in pre-procedural heart rates between the two groups. During the procedure, both groups experienced an increase in mean pulse rate, with Group 1 at 109.12 and Group 2 at 114.80 beats per minute, closely approaching significance with a p-value of 0.074, hinting at a possible greater sympathetic response in Group 2. Post-procedure, both groups' mean pulse rates reduced from the intra-procedural peaks, with Group 1 at 100.40 and Group 2 at 104.46 beats per minute, and the differences remained non-significant (p-value of 0.079). Notably, the most significant difference occurred while suctioning, with Group 1 at a mean pulse rate of 109.20 and Group 2 at 115.96 beats per minute, supported by a p-value of 0.030, indicating a statistically significant difference possibly related to a heightened response to the suctioning stimulus in Group 2.

In comparison, Imran MM et al.'s study assessed the efficacy of 1% versus 2% lignocaine for airway anaesthesia during flexible bronchoscopy and its impact on patient comfort and sedative drug use, but without specific mention of changes in pulse rates across different phases of the procedure. This becomes the advantage of this study over others where each parameter is considered for variables and its possible correlation with anesthetic and sedative use during procedure. Their study outcomes focused more on overall procedure satisfaction and lignocaine dosing, rather than the detailed hemodynamic responses observed in the current study. Nonetheless, both studies underscore the importance of monitoring vital signs during bronchoscopy to ensure patient safety and to tailor sedation and local anaesthesia accordingly.

For systolic blood pressure, the current study showed medians consistently at 120 mm Hg for both groups before and after the procedure, with slight but not significant elevations during the procedure and while passing through the larynx. These results suggest stability in systolic blood pressure management during the bronchoscopy in both groups. In terms of diastolic blood pressure, the medians remained stable at 80 mm Hg across all intervals in both groups, with no significant fluctuations, indicating a controlled diastolic response to the bronchoscopy in this cohort. In association, Imran MM et al. did not provide a detailed breakdown of hemodynamic responses such as systolic and diastolic blood pressure alterations during bronchoscopy. Thus, the current study provides additional hemodynamic insights not covered in any other study. Altogether, the current study's detailed assessment of pulse rate and blood pressure responses offers a closer observation of the hemodynamic fluctuations patients may experience during bronchoscopy and points to the need for vigilant monitoring and individualized patient care during such

procedures. These considerations are crucial when devising protocols for sedation and local anaesthesia, aiming to minimize physiological stress and enhance patient comfort during bronchoscopic examinations.[55]

In the current study, analysing haemodynamic parameters, specifically respiratory rate, presents significant insights. Before the procedure, the median respiratory rate was 20.50 per minute in Group 1, with a narrow interquartile range (IQR) of 2.00, and 22.00 per minute in Group 2 with a broader IQR of 4.00, showing a statistically significant difference ($p = 0.025$). During and after the procedure, as well as while passing through the larynx and suctioning, Group 2 consistently showed higher median respiratory rates and lower IQRs, which indicates a more uniform response among the group. Notably, the most pronounced differences post-procedure and during laryngeal passage and suctioning ($p = 0.005$, $p = 0.001$, and $p = 0.001$ respectively) suggest that Group 2 had a heightened respiratory response to these specific procedural stimuli.

For oxygen requirements, initially, the same percentage of patients in both groups required supplemental oxygen before the procedure. However, during the procedure and particularly while passing through the larynx and during suctioning, a significantly higher percentage of Group 2 required additional oxygen ($p = 0.006$ and $p = 0.011$ respectively), implying increased respiratory demand or reduced pulmonary efficiency during these phases. When discussing oxygen saturation, both groups maintained comparably high median saturation levels throughout all intervals, with no statistically significant differences, indicating effective oxygenation management during the bronchoscopy.

In the current study, side effects of lignocaine are documented across two groups following a procedure. Group 1 primarily experienced bronchospasm, with 28% of patients affected, while other complications like cough and involuntary hand and leg movements were minimal (2% and 0%, respectively). Notably, the majority of Group 1 (70%) did not experience any complications. Group 2 had a significantly higher incidence of bronchospasm, with 74% affected, and a single instance of involuntary hand and leg movements (2%), with no reported cases of cough. Only 24% of Group 2 did not experience complications.

Higher incidence of bronchospasm in 2% lignocaine group (74%) compared to 1% group (14%) with p value <0.001 showing statistically significant difference between two groups may be due to lignocaine induced bronchoconstriction and preservative methylparaben, used preparation of lignocaine, may be responsible for the response. Irritant effect of lignocaine leads to reflex vagal bronchoconstriction. Study by Lawrence G et al has shown that a significant proportion of patients with asthma will develop bronchoconstriction following inhalation of lidocaine and that this cannot be predicted from the histamine responsiveness.[56] However no further studies about bronchospasm side effects of topical 2 percentage lignocaine is available for comparison. So from this study it can be postulated that the patients with more allergy history may develop bronchospasm as in asthma patients which is found in the above study.

Comparing these findings with the study by Müller T et al., which investigated nebulization versus standard application for topical anaesthesia during flexible bronchoscopy under moderate sedation, reveals differing methodologies but a similar focus on patient safety and comfort.[22] Müller et al. found that nebulized lidocaine was

associated with reduced consumption and a lower complication rate compared to the syringe administration. Although not directly comparable due to different study parameters, these findings both highlight the importance of methods of application of lignocaine with its complications and safety.

In contrast to the Liao W et al. study in 2012, which compared dexmedetomidine and midazolam for conscious sedation during flexible bronchoscopy, the current study's results on oxygen supplementation needs resonate with their findings of better oxygen saturation with dexmedetomidine.[57] This parallel suggests that the sedative choice can significantly impact respiratory function during bronchoscopy. In this study commonly used sedatives were Fentanyl and Midazolam.

Biswal et al.'s study focused on complications related to endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA), comparing 1% and 2% lignocaine for topical airway anesthesia.[10] In this study, operator-rated overall procedural satisfaction and cough were among the primary endpoints, with no significant differences in these parameters between the 1% and 2% groups, despite the 2% group receiving a significantly greater cumulative dose of lignocaine. The secondary outcomes included adverse events, but specific complications were not as prominently detailed as in the current study.

The current study details sedation methods used during a procedure, comparing Group 1 and Group 2. In Group 1, 84% of patients received Fentanyl as the single sedative, while 14% received Fentanyl with Midazolam. One patient didn’t require sedation in Group 1. In Group 2, 86% of patients received only Fentanyl, while 14% received the combination of Fentanyl and Midazolam. All patients in Group 2 required sedation. The p-value of 1.000 indicates no significant difference in

sedation practices between the two groups, suggesting a standard approach to sedation. In a review conducted by Ricardo et al., author has explained the use of sedation in flexible bronchoscopy in a broader context, noting considerable variation among physicians in the use of sedatives and pre-procedure medication.[58] Unlike the present study, which shows a consistent pattern of sedation practices, Ricardo et al. study there was lack of standardized practices for sedation. They also highlight the safety and cost-effectiveness of non-anesthetist-administered sedation, suggesting this approach could be more widely adopted to ensure efficiency and patient comfort.

In the present study an overall procedural satisfaction was noted, measured by the Visual Analog Scale (VAS), showed no significant difference between the 1% lignocaine group (mean 64.2±25.6) and the 2% group (mean 68.7±23.6), with a p-value of 0.35. Similarly, cough score did not significantly differ, with a median of 48.4 (23.8–69.9) for the 1% group and 38.7 (18.5–69.5) for the 2% group (p=0.24). However, the cumulative dose of lignocaine was significantly higher in the 2% group, with a mean of 248.61±29.06 mg compared to 178.53±14.56 mg in the 1% group ($p<0.001$). Fentanyl doses and midazolam use also showed no significant difference. This parameter was comparable with study done by Harpeet Kaur et al.[36]

Similarly in a study conducted by Biswal et al., also explores post-procedural data, primarily comparing the effectiveness of 1% and 2% lignocaine for topical airway anesthesia. Their study also showed overall procedural satisfaction and cough score showed no significant differences between the 1% and 2% groups which is similar to the current study. Despite the higher cumulative dose of lignocaine in the 2% group, both studies found no difference in operator-rated satisfaction or cough outcomes.[10]

In the current study, both groups maintain a consistent median oxygen saturation of 98.00% before the procedure, with a 2.00% interquartile range (IQR), indicating a similar spread of oxygen saturation values. During the procedure, the median remains steady at 98.00% for both groups, with Group 1 exhibiting a slightly broader IQR of 4.00% compared to Group 2's 3.00%, suggesting slightly more variability in Group 1. After the procedure, the median oxygen saturation drops to 97.50% for Group 1, while it remains at 98.00% for Group 2. In both cases, the p-values indicate no significant difference in oxygen saturation, indicating haemodynamic stability. In Biswal et al., the baseline characteristics show that oxygen saturation is similarly stable between the two groups, with the 1% lignocaine group having a mean SpO2 of 96.32±1.74% and the 2% group at 96.56±2.25%.[10] The p-value of 0.55 indicates no significant difference between the groups. Other haemodynamic parameters, such as heart rate, respiratory rate, and blood pressure, also show consistency across the two groups. Heart rate averages are nearly identical, and respiratory rates are likewise similar. The systolic blood pressure differs slightly, with the 1% group averaging 123.94±16.37 mmHg, and the 2% group at 132±17.46 mmHg, while diastolic blood pressure remains close, with slight variations. The common thread in both studies is the consistency in oxygen saturation and haemodynamic parameters across the different groups, with no significant differences in these measures, suggesting that different concentrations of lignocaine have minimal impact on these haemodynamic outcomes.

Lidocaine is commonly used as a topical anesthetic during bronchoscopy procedures, but it can pose challenges when a patient has a lidocaine allergy or allergies to multiple topical anesthetics. The underlying cause of hypersensitivity reactions from lidocaine is often associated with parabens within the solution, which

are thought to have sensitizing properties. The case report by Hensley et al., explores the use of chloroprocaine as an alternative in patients with lidocaine allergies.[40] Chloroprocaine is a local anaesthetic developed for spinal anaesthesia and is an ester, in contrast to lidocaine and bupivacaine, which are amides.[59] This structural difference contributes to a shorter half-life, resulting in shorter recovery times and less neurotoxicity compared to lidocaine and bupivacaine. While concerns exist about transient neurologic symptoms, evidence for serious adverse effects with chloroprocaine is inconclusive. Chloroprocaine has about half the potency of lidocaine when used for local anesthesia, offering a viable alternative for patients with lidocaine allergies or other hypersensitivity reactions.[60] This information underscores the importance of exploring alternative anesthetics in cases of lidocaine allergy, ensuring bronchoscopy procedures can be safely conducted with minimal risk to patients with hypersensitivity concerns.

Lignocaine toxicity can be a serious concern during procedures such as fiberoptic bronchoscopy (FOB), where local anesthesia is required to minimize discomfort. Toxicity is typically associated with high plasma concentrations of lignocaine, often exceeding 5 µg/ml, and can lead to adverse effects ranging from mild symptoms like dizziness and tingling to severe complications like seizures or cardiac arrest.[61] In the study conducted by Lourdes et al., researchers monitored plasma concentrations of lignocaine before, during, and after FOB to understand the risk of toxicity in patients receiving higher-than-recommended doses.[62] The study involved administering lignocaine in three forms: a 2% solution via a larynx syringe, a 2% gel, and a 2% solution through the bronchoscope, with a total dose averaging 622 ± 20 mg—exceeding the typical maximum recommendation of 400 mg. Blood samples were taken at multiple intervals, and results showed that peak plasma

concentrations of lignocaine occurred within 20–30 minutes after the start of local anaesthesia. Despite the high doses, none of the patients in the study reached the critical toxicity threshold, suggesting that even higher doses may be used safely during FOB without exceeding toxic plasma levels. Moreover, no significant adverse reactions were observed among the patients. These findings offer critical insights into lignocaine toxicity, indicating that its administration, even in high doses, does not necessarily lead to toxic levels in the bloodstream.

The incidence of systemic toxicity from local anesthetics has decreased significantly over the past 30 years, dropping from 0.2% to 0.01%. Despite this improvement, certain procedures still carry risks. [63]

Local anaesthetic toxicity can manifest in various forms, including cardiac toxicity, neurotoxicity, and allergic reactions.[63]The key to reducing these risks lies in careful administration, proper technique, and prompt response to any signs of toxicity. Understanding these risks and their implications is crucial for clinicians and patients alike to ensure safe and effective regional anesthesia.[64]

From this study significant variations were observed in respiratory rate and systolic blood pressure at different stages of the procedure, highlighting dynamic patient responses between two groups. The study found that 2% lignocaine had a more pronounced effect on respiratory rates and systolic blood pressure, indicating a dose-dependent response. Both groups maintained stable median oxygen saturation levels. The cumulative dose of lignocaine was significantly higher in group 2.Side effects of lignocaine was higher in Group 2 compared to Group 1, which was statistically significant with p value<0.001.Among side effects of lignocaine higher incidence of bronchospasm was observed in the 2% lignocaine group (74%)

compared to the 1% group (28%).Group 2 (2% lignocaine) showed a lower bacterial growth rate (32%) compared to Group 1 (1% lignocaine) at 46%, although not statistically significant. Visual Analog Scale (VAS) scores and cough scores showed no significant difference between groups, despite the higher cumulative dose of lignocaine in the 2% group. These findings highlight the nuanced effects of lignocaine concentration on patient responses and emphasize the importance of individualized patient care during bronchoscopy.

LIMITATIONS OF THE STUDY

Despite its valuable insights, the study exploring the effects of different lignocaine concentrations had some constraints that could guide future research.

- The relatively small sample size of 50 patients per group might have limited the statistical power to detect subtle effects, highlighting the need for larger sample sizes in future studies.

- Randomization and blinding were utilized to minimize bias; however, maintaining complete blinding can be challenging in a clinical setting, which could slightly impact outcomes.

- The investigator is not blinded creating the selection bias

- Demographic variability also emerged as an area to consider, with variations in age, height, and body mass index (BMI) across the groups potentially introducing confounding factors.

- The presence of comorbidities and differing medical histories could further complicate the interpretation of the results.

- Nonetheless, these variations offer a broader context to understand how individual characteristics might affect the response to lignocaine.

By acknowledging these limitations, the study points to important considerations for future research.

Future Scope

A larger sample size would increase the statistical power, providing more confidence in the results. This approach would allow researchers to detect subtler effects and ensure that the findings are applicable to a broader population.[65] An extended follow-up period could yield valuable insights into long-term outcomes and potential late-onset complications, enabling a more comprehensive understanding of patient recovery and long-term effects.[66] Comparative studies could explore different techniques and concentrations of lignocaine, allowing for a broader perspective on their effectiveness. This could include examining alternative anesthetic agents or varying procedural techniques to determine which offers the best balance of efficacy and safety.[67]

Interventional studies focusing on reducing stress responses and complication rates could be highly beneficial. These studies could explore innovative methods to improve patient comfort and procedural safety, potentially leading to best practices for medical procedures involving lignocaine.[68]

SUMMARY

- The study was conducted as a randomized control trial at KLE's Dr Prabhakar Kore Charitable Hospital and Medical Research Center in Belagavi over one year period ``on patients who underwent flexible bronchoscopy. Candidates for the study were screened based on inclusion and exclusion criteria.

- Patients were randomly assigned to either Group 1 or Group 2, receiving 1% or 2% lignocaine solution, respectively.

- Randomization was done in a 1:1 ratio using a computer-generated sequence, with assignments placed in sealed opaque envelopes.

- Both the bronchoscopist and the patients were blinded to the concentration of lignocaine used.

- Patients' demographic details, such as age, sex, height, weight, BMI, and smoking history, were meticulously recorded.

- Hemodynamic parameters like pulse rate, blood pressure, and oxygen saturation were continuously monitored.

- The bronchoscopist used a visual analogue scale to assess patient satisfaction immediately post procedure

- CSS by patient and bronchoscopist was noted, cough count during the procedure was recorded and side effects of lignocaine was noted

- Data was analysed using SPSS software (version 22). Categorical data were represented by frequencies and proportions, with the Chi-square test used for significance testing. Continuous data were analysed using means and standard deviations, with the Independent t-test to determine mean differences.

- A p-value of less than 0.05 indicated statistical significance.

- Regarding oxygen requirements, Group 2 displayed a higher need for supplemental oxygen compared to Group 1 at various stages of the procedure.

- During the procedure itself, 50% of participants in Group 1 required oxygen, while this number was significantly higher in Group 2, with 76% needing oxygen. This difference was statistically significant, with a p-value of 0.006. A similar pattern was observed when passing through the larynx and during suctioning, indicating that Group 2 consistently required more oxygen.

- Pulse rates were also examined, with Group 2 generally exhibiting higher rates during most intervals of the procedure. For example, during suctioning, the pulse rate for Group 2 was significantly higher than that for Group 1, with a p-value of 0.030, indicating a statistically significant difference. This trend of elevated pulse rates in Group 2 suggests a higher level of physiological stress compared to Group 1.

- Respiratory rates followed a similar trend, with Group 2 showing consistently higher rates compared to Group 1 across different intervals.

- The study also reported that Group 2 experienced a significantly higher rate of side effects of lignocaine post-procedure.

- Bronchospasm was more prevalent side effect in Group 2 (74%) compared to Group 1 (28%). This notable difference in complication rates was statistically significant, with a p-value of less than 0.001, indicating that Group 2 faced a higher risk of adverse outcomes.

- Involuntary leg movements and cough was other side effects noted in group 2 (2%)

- In terms of lignocaine dosage, Group 2 received a significantly higher dose compared to Group 1. The median dose for Group 2 was 213.00 mg, while it was 106.50 mg for Group 1, with a statistically significant p-value. This significant dosage difference could explain the higher stress responses observed in Group 2.

- The study also examined clinical severity scores (CSS) and cough counts. Although the median CSS was similar between the groups, Group 2 displayed a broader range in CSS variability, with an interquartile range of 10.00, suggesting greater variability in severity.

- Additionally, the cough count was higher for Group 2, indicating more post-procedure coughing.

- Systolic and diastolic blood pressure readings showed slight variability, but overall, the groups were comparable, with no significant changes across various intervals during the procedure. This stability in blood pressure contrasts with the other parameters where Group 2 showed higher levels of physiological stress.

- The study's results suggest that Group 2 generally exhibited higher stress responses during the procedure, with increased oxygen requirements, pulse rates, respiratory rates, and side effects of lignocaine.

- Group 1 demonstrated more stability in these parameters, indicating the importance of careful monitoring and tailored interventions to manage the heightened stress responses observed in Group 2.

- BAL c/s showed higher positivity (46 %) in Group 1 compared to Group 2(32 %) with p-value of 0.218 indicating that difference in growth rates between two groups is not statistically significant.

CONCLUSION

The study concluded that, in the routinely done procedure like bronchoscopy the 1% lignocaine can be confidently used over 2% lignocaine to avoid more dose requirements of the drug with overall similar drug efficacy as 2% lignocaine and with a better safety profile and lesser drug reactions.2% lignocaine group showed increased physiological stress response during procedure.

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ANNEXURE-1

KAHERs JNMC BELAGAVI

INFORMED CONSENT FORM

"The efficacy of 1% versus 2% lignocaine solution administered by "working channel" method for topical anesthesia in flexible bronchoscopy without administration of concurrent lignocaine nebulization"

Name of Student/Principal Investigator: REG NO. BR0121004

Name of Guide/Co Investigators:

Objective:

Primary outcome is comparison of hemodynamic effect of 1% vs. 2% lignocaine as topical anesthetic

Secondary outcome is patient comfort assessed by VAS scale, operator satisfaction, cough severity count, need for added method of anesthesia, cumulative doses of lignocaine, procedural complications

Introduction:

Flexible bronchoscopy (FB) is a widely used procedure for the diagnosis and treatment of a variety of bronchopulmonary disorders because of patient comfort, low rate of complications, and lack of requirement of general anesthesia. The most common agent used for local anesthesia in bronchoscopy is lignocaine. Lignocaine is preferred as it has quick onset of action, short half-life and a good safety profile. Although use of

lignocaine is reasonably safe, potential complications related to lignocaine administration during bronchoscopy have been reported like cardiac complications, bronchoconstriction in asthmatics etc. Therefore, the determination of minimum effective lignocaine concentration for airway anesthesia is important

Explanation of procedure:

Patient will receive either 1% lignocaine or 2% lignocaine as topical anesthetic. Hemodynamic parameters PR, BP , SPO2 before , during and after bronchoscopy will be monitored using digital monitoring .BP before and after procedure will be monitored manually .Patients will be monitored for any adverse effects related to lignocaine use (like arrhythmia, involuntary movements, convulsions, anaphylaxis, and bronchospasm). Cough count during procedure was recorded. Cough and pain severity will be recorded using VAS for cough and pain respectively. Total time of procedure will be 20 minutes.

Withdrawal from participation in the study: Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will/will not have nor get any benefits by participating in this study. The data gathered will help the population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person from identifying you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purposes and or presented to scientific groups. However, your identity will never be revealed.

Questions:

If you have any question or complaints with regard to your right as study participant you may contact Dr Harsha Hegde, Chairperson, Ethical committee of JNMC, 0831-2473777 Extension 4052.

Legal rights: By signing this consent form, we are not waving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study "The efficacy of 1% versus 2% lignocaine solution administered by "working channel" method for topical anesthesia in flexible bronchoscopy without administration of concurrent lignocaine nebulization". My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

ANNEXURE -2

CASE PERFORMA

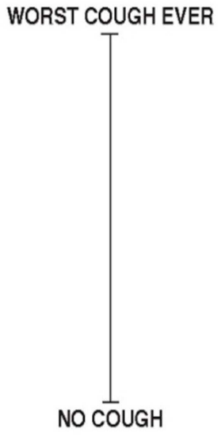
- Name
- Age
- Sex
- Height
- Weight
- BMI
- The type of procedure performed (airway inspection, BAL, EBB, TBLB)
- Comorbidities
- Medical history
- Surgical history
- Personal history
- Smoking history
- Past history
- Allergy history
- Viral markers
- PT, aPTT, INR
- Study group

	BEFORE	**DURING**	**AFTER**
PR			
SYSTOLIC BP			
DIASTOLIC BP			
RR			
SPO2			

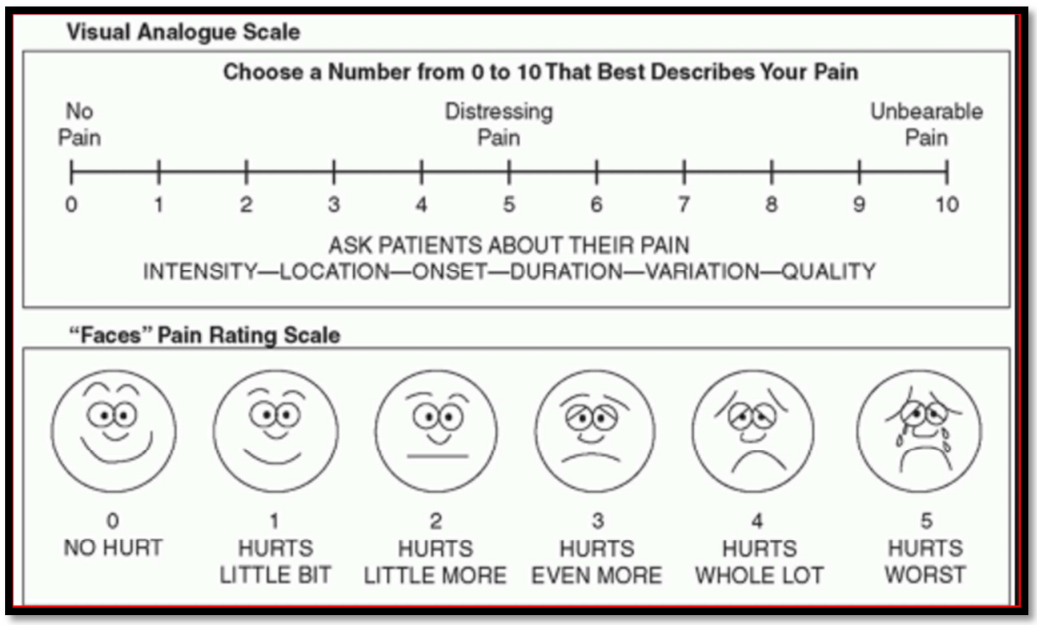
- Change in hemodynamic parameter

	While passing larynx	**Suctioning**
HR		
SYSTOLIC BP		
DIASTOLIC		
RR		
SPO2		

- Cough severity score by VAS



- Cough count during procedure
- Need for added anesthetic methods
- Cumulative doses of lignocaine
- Visual analogue scale for pain



BY BRONCHOSCOPIST	
BY PATIENT	

- Side effects of Lignocaine

ANNEXURE -3

KEY TO MASTERCHART

BMI	Body Mass Index
PR	Pulse Rate
BP	Blood Pressure
SPO2	Saturation of Oxygen
RR	Respiratory Rate
CSS	Cough Severity Score
VAS	Visual Analogue Scale
C/S	Culture/Sensitivity
BAL	Bronchoalveolar Lavage
TBNA	Tranbronchial Needle Aspiration
TBLB	Transbronchial Lung Biopsy
HTN	Hypertension
T2DM	Type II Diabetes Mellitus
IHD	Ischemic Heart Disease
PTB	Pulmonary Tuberculosis

EPTB	Extra Pulmonary Tuberculosis
CKD	Chronic Kidney Disease
BA	Bronchial Asthma
CABG	Coronary Artery Bypass Surgery
LSCS	Lower Segment Caesarean Section

ANNEXURE -4

MASTERCHART

Name	IP No	Age	Sex	Height	Weight	BMI	Procedure Performed	Comorbidities	Past History	Surgical History	Personal History	Smoking History	Allergy History	Viral Markers	PR before	Systolic BP before	Diastolic BP before	RR before	SPO2 before	PR During	Systolic BP During	Diastolic BP During	RR During	SPO2 During	PR After	Systolic BP After	Diastolic BP After	RR After	SPO2 After	HR While passing larynx	Systolic BP While passing larynx	Diastolic BP While passing larynx	RR While passing larynx	SPO2 While passing Larynx	PR While suctioning	Systolic BP While suctioning	Diastlic BP While suctioning	RR While suctioning	SPO2 While suctioning	CSS by Bronchoscopist	CSS by Patient	Cough count	Sedation	Cumulative dose	Lignocaine dose(mg)	Percentage	VAS pain Bronchoscopist	VAS pain patient	Complication	BAL C/S
Yallapa	11189656	36	M	170	68	23.53	BAL	HTN	Nil	Nil	loss of appetite+	Smoker	Nil	Negative	80	120	80	24	98 in RA	98	130	80	28	98 in 2l O2	94	130	80	28	97 in RA	96	130	80	24	97 in RA	96	130	80	28	97 in RA	30	30	8	50mcg Fenatnyl	10 ml	213	2%	1	1	Nil	No Growth
Ashwini	1183355	23	F	156	40	16.42	TBLB, BAL	Nil	Nil	Nil	loss of appetite+	Non-Smoker	Dust allergy	Negative	70	120	80	24	96 in RA	90	130	80	28	96 in 3L O2	90	130	80	28	96 in RA	90	130	80	24	96 in 3LO2	90	130	80	24	96 in 3L O2	20	20	15	50mcg Fenatnyl 1mg Midazolam	10 ml	213	2%	1	2	Bronchospasm	Growth+
Karthik	1118456	21	M	165	46	16.87	BAL	Nil	Nil	Nil	loss of appetite+	Smoker	Nil	Negative	97	120	70	24	98 in RA	103	136	110	28	98 in RA	100	110	70	26	98 in RA	98	130	110	26	98 in 1L 02	106	130	110	28	98 in 1L O2	0	5	4	50mcg Fentanyl	10ml	213	2%	0	0	Nil	No Growth
Nagaraj	1145972	67	M	170	45	15.57	BAL	IHD	Nil	CABG	loss of appetite+	Smoker	Nil	Negative	75	120	70	22	98 in 2L O2	100	120	80	28	98 in 2l O2	96	130	80	28	98 in 2L O2	96	130	80	28	98 in 2L O2	96	130	80	28	98 in 2L O2	50	50	35	50mcg Fentanyl	10 ml	213	2%	1	1	Nil	No Growth
Govindamma	1154245	53	F	156	70	28.76	TBLB, BAL	Nil	Nil	Nil	Normal	Non-Smoker	Nil	Negative	94	130	80	24	98 in 2L O2	112	140	80	27	98 in 5L O2	104	140	80	27	98 in 2L O2	112	140	80	28	98 in 5L O2	112	140	80	28	98 in 5L O2	20	20	30	50mcg Fentanly	10 ml	213	2%	1	1	Bronchospasm	Growth+
Boramma	1155467	45	F	145	42	20.05	BAL	Nil	PTB	Nil	Normal	Non-Smoker	Nil	Negative	96	120	70	24	99 in RA	160	130	80	36	98 in 2l O2	125	130	80	34	98 in 2L O2	156	130	80	30	98 in 2L 02	166	130	80	34	98 in 2L O2	25	25	25	50mcg Fentanyl	10 ml	213	2%	1	2	Bronchospasm	No Growth
Nanasab	1144567	71	M	170	60	20.76	TBLB, BAL	Nil	EPTB	Nil	loss of appetite+ ,Tobacco Chewer	Non-Smoker	Nil	Negative	95	140	90	22	98 in RA	120	160	100	28	98 in 2l O2	130	160	110	30	99 in 2L O2	122	160	100	28	98 in 5L O2	124	160	100	28	98 in 5L O2	60	60	60	50mcg Fentanyl,1 mg Midazolam	10ml	213	2%	2	2	Nil	No Growth
Khairunabi	1156777	73	F	151	46	20.2	BAL	Nil	BA	Nil	Normal	Non-Smoker	Nil	Negative	100	130	70	22	96 in RA	102	130	70	28	94 in RA	116	140	80	28	92 in RA	112	130	70	28	94 in RA	116	140	70	28	92 in RA	20	25	15	50mcg Fentanyl	20 ml	426	2%	1	2	Bronchospasm	Growth+
Prashant	1154678	51	M	166	68	24.68	BAL	HTN,T2DM	CLD	Nil	loss of appetite	Smoker	Nil	Negative	128	150	100	22	98 in 2L O2	146	150	100	26	98 in 2l O2	120	150	100	26	98 in 2L O2	140	150	100	26	98 in 2L O2	140	150	100	26	98 in 2L O2	10	10	15	-	10 ml	106.5	1%	0	0	Nil	Growth+
Satyappa	1120387	79	M	168	63	22.32	BAL	HTN,T2DM	Nil	Nil	Normal	Smoker	Nil	Negative	82	130	70	20	98 in RA	112	140	70	22	98 in RA	90	140	70	24	97 in RA	94	140	70	24	97 in RA	94	140	70	24	97 in RA	20	10	20	50mcg Fentanyl	10 ml	106.5	1%	1	1	Bronchospasm	Growth+
Yogesh	1158496	28	M	168	45	15.95	BAL	HTN	CKD,Anemia	Nil	loss of appetie	Non-Smoker	Nil	Negative	104	160	90	24	98 in 5L 02	114	160	90	28	99 in 5L O2	114	160	90	28	99 in 5L O2	114	160	90	28	99 in 5L O2	114	160	90	28	99 in 5L O2	20	25	30	50mcg Fentanyl	10 ml	213	2%	2	2	Nil	No Growth
Janba	1199292	52	M	170	56	19.38	BAL	Nil	PTB	Nil	Normal	Non-Smoker	Nil	Negative	80	130	80	24	98 in RA	100	130	80	28	98 in 2L O2	100	130	80	28	98 in 2L O2	100	130	80	28	98 in 2L 02	98	130	80	28	98 in 2L O2	20	20	20	50mcg Fentanyl	10 ml	106.5	1%	1	2	Bronchospam	No Growth
Sarita	1158316	48	F	158	50	20.04	BAL	Nil	Pemphigus Vulgaris	Nil	Normal	Non-Smoker	Nil	Negative	100	130	80	20	98 in 3L O2	103	130	80	26	98 in 3L O2	104	130	80	28	99 in 3L O2	104	130	80	26	98 in 3L O2	104	130	80	26	98 in 3L O2	10	20	20	50mcg Fentanyl	10 ml	106.5	1%	0	0	Bronchospasm	No Growth
Santhosh	1156318	33	M	170	45	15.57	BAL	Nil	PTB	Nil	loss of appetie+, Tobacco Chewer, Alcoholic		Nil	Negative	120	110	70	22	98 in RA	140	120	70	30	98 in 4L O2	120	120	70	28	98 in RA	138	120	70	28	98 in 4L O2	138	120	70	28	98 in 4L O2	25	25	25	50mcg Fentanyl	10 ml	213	2%	2	2	Bronchospasm	No Growth
Iranna	1197445	50	M	176	60	19.36	TBLB, BAL	HTN	Vasculitis	Nil	Normal	Smoker	Nil	Negative	80	120	80	20	98 in RA	98	130	80	24	98 in RA	94	130	80	24	98 in RA	98	130	80	24	98 in RA	98	130	80	24	98 in RA	20	20	25	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+
Paravati	1134567	69	F	146	60	27.87	BAL	HTN,T2DM	Nil	Nil	Normal	Smoker	Dust allergy	Negative	100	140	90	22	96 in RA	130	140	90	28	94 in 3L O2	102	140	90	28	99 in 2L O2	130	140	90	28	94 in 3L O2	134	140	90	28	94 in 3L O2	20	20	25	50mcg Fentanyl	10ml	213	2%	1	2	Bronchospasm	Growth+
Ningappa	1145689	77	M	170	50	17.3	BAL	Nil	Nil	Nil	loss of appeite	Smoker	Nil	Negative	86	130	80	24	95 in RA	98	140	80	28	98 in 5L O2	94	140	80	28	98 in 3L O2	98	140	80	28	98 in 5L O2	98	140	80	28	98 in 5L O2	20	25	25	50mcg Fentanyl	10ml	106.5	1%	1	1	Bronchospasm	Growth+
Mahaling	1205396	59	M	170	56	19.38	BAL	HTN	nil	Nil	loss of appetite	Smoker	Nil	Negative	90	110	80	22	98 in 2L O2	116	114	80	28	98 in 5L O2	96	130	80	28	96 in 2L O2	112	120	80	28	98 in 5L O2	116	130	80	28	98 in 5L O2	25	25	30	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth
Dayanad	1209824	65	M	164	58	21.5	BAL	HTN	Nil	Appendicectomy	Normal	Smoker	Nil	Negative	92	120	70	20	98 in RA	122	120	70	26	98 in RA	98	120	70	24	98 in RA	118	120	70	26	98 in RA	118	120	70	26	98 in RA	15	15	15	50mcg Fentanyl	10ml	106.5	1%	1	1	Bronchospasm	Growth+
Mallapa	1205596	65	M	170	58	20.07	BAL	HTN,T2DM	Nil	Nil	loss of appetite, Tobacco chewer	Smoker	Nil	Negative	80	120	80	20	98 in RA	112	130	80	28	98 in 2l O2	100	130	80	28	98 in 2L O2	110	130	80	28	98 in 2L O2	110	130	80	28	98 in 2L O2	10	10	10	50mcg Fentanyl	10ml	213	2%	1	1	Nil	No Growth
Vinayak	1204567	34	M	169	83	29.04	BAL	Nil	Nil	Radius fracture plating	loss of appetite	Smoker	Nil	Negative	93	130	80	20	98 in RA	120	130	80	24	98 in RA	112	130	80	24	98 in RA	120	130	80	24	98 in RA	120	130	80	24	98 in RA	60	40	40	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+
Rajana	1209876	36	F	156	62	25.47	BAL	T2DM	PTB	Nil	loss of appetite	Non-Smoker	Nil	Negative	110	110	70	22	95 in RA	120	110	70	25	98 in 3L O2	114	110	70	26	96 in RA	126	110	70	24	98 in 3L O2	124	120	70	24	98 in 3L O2	10	20	20	50mcg Fentanyl	10ml	106.5	1%	1	1	Bronchospasm	No Growth
Savita	1203604	40	F	160	48	18.75	BAL	Nil	Nil	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	86	110	70	20	98 in RA	124	120	80	28	98 in 2l O2	102	120	80	26	98 in RA	120	120	80	28	98 in 2L O2	120	120	80	28	98 in 2L O2	25	25	18	50mcg Fentanyl	10ml	213	2%	1	1	Bronchoscam	No Growth
Mohammoda	1205674	34	F	156	60	24.6	TBLB, BAL	Nil	BA	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	107	130	80	22	98 in 2L O2	110	140	80	28	98 in 5L O2	110	140	80	28	98 in 2L O2	110	140	80	24	98 in 5L O2	112	140	80	24	98 in 5L O2	60	50	50	50 mcg Fentanyl , 1 mg Midazolam	10ml	106.5	1%	2	2	Bronchospasm	Growth+
Shanteravva	1208945	56	F	156	65	26.67	BAL	Nil	PTB	Nil	loss of appetite	Non-Smoker	Nil	Negative	112	120	80	24	98 in 4L O2	140	130	80	28	98 in 8L O2	120	130	80	28	98 in 4L O2	138	130	80	28	98 in 8L O2	140	130	80	28	98 in 8L O2	20	20	20	50mcg Fentanly	10ml	213	2%	1	2	Nil	No Growth
Krishna	1240895	60	M	168	60	21.26	TBLB, BAL	T2DM,IHD	Nil	Nil	loss of appetite	Smoker	Nil	Negative	79	140	90	20	99 in RA	102	150	90	24	99 in 5L O2	102	150	90	24	99 in 2L O2	102	150	90	24	99 in 5L O2	94	150	90	24	99 in 5L O2	20	20	27	50mcg Fentanyl	10ml	106.5	1%	1	1	Bronchospasm	No Growth
Afreen	1205678	32	F	159	32	12.68	BAL	Nil	PTB	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	114	130	70	30	96 in RA	142	130	80	38	98 in 5L O2	130	130	80	38	98 in 5L O2	142	130	80	38	99 in 5L O2	142	130	80	38	98 in 5L O2	30	30	49	50mcg Fentanyl,1 mg Midazolam	10ml	106.5	1%	2	2	Bronchospasm	Growth+

Shivappa	1204896	42	M	167	52	18.66	BAL	T2DM	Nil	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	104	120	80	22	98 in RA	130	130	80	26	98 in 2l O2	120	130	80	26	98 in RA	126	130	80	26	98 in 2L O2	126	130	80	26	98 in 2L O2	20	15	15	50mcg Fentanyl,1 mg Midazolam	10 ml	213	2%	1	2	Bronchospasm	No Growth
Imansab	1205698	65	M	170	70	24.22	BAL	T2DM, HTN,IHD	Nil	Nil	loss of appetite	Smoker	Nil	Negative	80	120	70	26	98 in RA	90	110	70	28	98 in 2l O2	82	110	70	28	98 in RA	88	110	70	28	99 in2L O2	90	110	70	28	98 in 2L O2	20	20	30	50mcg Fentanyl,1 mg Midazolam	10ml	106.5	1%	0	1	Nil	Growth+
Prashuram	1206437	40	M	165	48	17.63	BAL	Nil	PTB	Nil	loss of appetite	Smoker	Nil	Negative	80	110	70	20	98 in RA	110	120	70	26	98 in 2l O2	100	120	70	26	98 in RA	110	120	70	26	98 in 2L O2	112	120	70	26	98 in 2L O2	25	25	25	50mcg Fentanyl,1 mg Midazolam	10ml	213	2%	1	2	Nil	No Growth
Bharati	1206933	50	F	156	70	28.76	BAL	HTN	Nil	LSCS	loss of appetite	Non-Smoker	Nil	Negative	90	120	80	20	98 in RA	120	130	80	26	98 in 2l O2	110	130	80	26	96 in RA	120	130	80	26	98 in 2L O2	118	130	80	26	98 in 2L O2	25	25	30	50mcg Fentanyl	10ml	213	2%	1	2	Bronchospasm	Growth+
Sachin	1207523	24	M	170	56	19.38	TBLB, BAL	Nil	Nil	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	92	120	80	20	96 in RA	114	130	80	24	98 in 2l O2	114	130	80	24	98 in 2L O2	120	130	80	24	98 in 2L O2	122	130	80	24	98 in 2L O2	20	20	20	50mcg Fentanyl	10ml	213	2%	1	1	Nil	No Growth
Nadanbi	1156338	67	F	158	48	19.23	TBNA, BAL	HTN,T2DM	PTB	Nil	loss of appetite	Non-Smoker	Nil	Negative	85	150	90	24	94 in 2LO2	103	150	90	28	98 in 4L O2	96	150	90	26	98 in 4L O2	104	150	90	28	98 in 4L O2	106	150	90	28	98 in 2L O2	20	30	56	50mcg Fentanyl,1 mg Midazolam	5ml	106.5	1%	2	2	Bronchospasm	Growth+
Seema	1187230	23	F	153	52	22.25	BAL	Nil	PTB	Nil	Normal	Non-Smoker	Nil	Negative	120	110	60	22	98 in RA	112	120	60	26	98 in RA	112	120	60	26	98 in RA	112	120	60	26	98 in RA	112	120	60	26	98 in RA	15	10	10	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Babu	1208972	68	M	168	68	24.1	BAL	Nil	Nil	Nil	Alcoholic	Smoker	Nil	Negative	77	140	90	20	95 in5L O2	90	150	90	26	92 in 10L O2	94	150	100	28	94 in 5L O2	96	150	90	28	92 in 10L O2	96	150	90	26	92 in10L O2	10	20	27	50mcg Fentanyl	10ml	106.5	1%	1	2	Bronchospasm	No Growth
Sushma	1208945	25	F	153	50	21.42	BAL	Nil	Seizure disorder, PTB	Nil	loss of appetite	Non-Smoker	Nil	Negative	106	120	80	24	99 in RA	128	120	80	32	89 in 10L O2	118	130	80	28	96 in 2L O2	128	130	80	29	89 in 10L O2	132	130	80	29	89 in10L O2	20	25	15	50mcg Fentanyl	10ml	106.5	1%	0	1	Nil	No Growth
Shivaji	1209832	50	M	178	50	15.79	BAL	Nil	Nil	Nil	loss of appetite +	Smoker	Nil	Negative	80	130	80	22	96 in RA	100	130	80	26	98 in 2l O2	90	130	80	26	98 in 2L O2	98	130	80	26	98 in 2L O2	98	130	80	26	98 in 2L O2	20	15	25	50mcg Fenanyl	10 ml	213	2%	1	1	Involuntary leg and hand movements	No Growth
	1193650	63	M	170	52	18.04	BAL	Nil	Potts spine	Nil	Tobacco chewer	Smoker	Nil	Negative	102	140	80	22	98 in RA	107	140	80	26	98 in RA	100	140	80	24	98 in RA	106	140	80	26	98 in RA	106	140	80	26	98 in RA	15	14	15	75mcg Fentanyl	10ml	106.5	1%	0	1	Nil	No Growth
Chandrappa	1209547	70	M	176	64	20.63	BAL	HTN,T2DM	Nil	TURP	Normal	Non-Smoker	Nil	Negative	94	120	70	20	98 in RA	102	124	70	26	95 in RA	98	130	70	24	96 in RA	102	124	70	26	95 in RA	102	124	70	26	95 in RA	10	10	15	50mcg Fenanyl	10ml	106.5	1%	0	1	Nil	Growth+
Arun	1204589	32	M	170	56	19.38	BAL	Nil	PTB	Nil	loss of appetite, Tobacco chewer	Smoker	Nil	Negative	100	120	70	20	98 in RA	124	120	70	24	96 in RA	102	120	70	23	98 in RA	122	120	70	24	96 in RA	122	120	70	24	96 in RA	20	20	23	50mcg Fentanyl	10ml	106.5	1%	0	0	Nil	No Growth
Ningappa	1203459	80	M	174	48	15.81	BAL	HTN,T2DM	Nil	Nil	loss of appetite	Smoker	Dust allergy	Negative	98	130	80	22	98 in RA	140	140	80	30	98 in 5L O2	120	140	80	28	98 in 2L O2	140	140	80	30	98 in 5L O2	140	140	80	30	98 in 5L O2	20	20	25	50mcg Fenanyl	10ml	213	2%	1	2	Bronchospasm	Growth+
Malakari	1201677	50	M	171	75	25.65	BAL	Nil	Ca Hypopharynx	Nil	Alcoholic	Smoker	Nil	Negative	90	130	80	20	98 in RA	110	130	80	24	98 in 2l O2	102	134	80	23	97 in RA	110	130	80	24	98 in 2L O2	110	130	80	24	98 in 2L O2	15	15	18	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth
Pratiba	7119393	32	F	165	54	19.83	BAL	Nil	PTB	LSCS	loss of appetite	Non-Smoker	Nil	Negative	94	120	90	20	98 in RA	134	130	90	29	98 in 5L O2	120	130	90	26	98 in 3L O2	134	130	90	30	98 in 5L O2	134	130	90	29	98 in2L O2	20	20	18	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	Growth+
Arun	1045678	31	M	180	70	21.6	BAL	Nil	PTB	Nil	loss of appetite, Tobacco chewer	Smoker	Nil	Negative	90	120	80	20	98 in RA	96	120	80	24	98 in RA	90	120	80	24	98 in RA	94	120	80	24	98 in RA	94	120	80	24	98 in2L O2	15	15	15	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Bhimappa	1166015	64	M	168	56	19.84	TBLB, BAL	Nil	Nil	Nil	loss of appetite, Tobacco Chewer , Alcoholic	Smoker	Nil	Negative	92	130	80	24	98 in RA	108	130	80	30	98 in 5L O2	102	130	80	28	98 in 2L O2	108	130	80	28	98 in 5L O2	108	130	80	28	98 in 5L O2	20	20	20	50mcg Fentanyl,1 mg Midazolam	20ml	426	2%	1	1	Bronchospasm	No Growth
Rammayya	1234590	48	M	168	64	22.68	BAL	HTN,T2DM	PTB	Nil	loss of appetite	Smoker	Nil	Negative	108	130	80	21	97 in RA	118	130	80	26	98 in 4L O2	104	130	80	26	98 in 2L O2	118	130	80	28	96 in 4L O2	118	130	80	28	98 in 4L O2	10	10	10	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+
Arjun	1203476	71	M	172	58	19.63	TBLB, BAL	HTN,T2DM	RHD	Nil	loss of appetite	Smoker	Nil	Negative	90	110	70	20	98 in RA	104	120	70	24	94 in RA	100	120	70	24	97 in RA	104	120	70	24	94 in RA	104	120	70	24	94 in RA	20	20	20	50mcg Fenatnyl	8ml	86.4	1%	1	2	Nil	No Growth
Arjun	1230678	61	M	168	50	17.72	BAL	HTN	Nil	Nil	loss of appetite	Smoker	Dust allergy	HbsAg+	63	120	70	20	98 in 2L O2	80	130	70	23	98 in 4L O2	78	126	70	22	98 in 2L O2	80	130	70	23	98 in 4L O2	82	130	70	23	98 in 4L O2	20	20	23	50 mcg Fentanyl	7ml	63.9	1%	1	2	Nil	Growth+
Sunita	7136820	40	F	164	43	16	BAL	Nil	Nil	Nil	loss of appeite	Non-Smoker	Nil	Negative	85	100	60	20	98 in 4L O2	112	110	60	28	98 in 6L O2	100	110	60	24	98 in 4L O2	124	110	60	28	98 in 6L 02	120	110	60	28	98 in 6L O2	20	20	21	100mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth
Shivakumar	1179547	18	M	168	60	21.26	BAL	Nil	EPTB	Nil	loss of appetite	Smoker	Nil	Negative	88	110	70	16	99 in RA	120	120	70	22	96 in RA	106	120	70	20	98 in RA	106	120	70	22	96 in RA	106	120	70	22	96 in RA	25	25	27	50mcg Fentanyl	10ml	213	2%	1	1	Nil	No Growth
Prashant	6918841	41	M	185	75	21.92	BAL	Nil	Nil	Nil	Normal	Non-Smoker	Nil	Negative	88	120	80	18	98 in RA	96	120	80	20	98 in RA	90	120	80	18	98 in RA	96	120	80	20	98 in RA	96	120	80	20	98 in RA	25	25	38	50 mcg Fentanyl,0.5 mg Midazolam	10ml	106.5	1%	1	2	Nil	Growth+
Hanamant	1169929	76	M	168	65	23.03	BAL	Nil	Nil	Nil	loss of appetite	Smoker	Nil	Negative	95	120	80	20	98 in RA	104	120	80	26	94 in RA	94	120	80	24	97 in RA	100	120	80	26	94 in RA	100	120	80	26	94 in RA	15	15	16	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	Growth+
Samad	1116733	62	M	170	65	22.49	BAL	Nil	IHD,Ca Esophagus	Nil	Normal	Smoker	Nil	Negative	86	120	70	16	98 in RA	65	130	70	20	96 in RA	88	120	70	20	97 in RA	80	130	70	20	96 in RA	82	130	70	20	94 in RA	20	20	21	50mcg Fentanyl	5ml	53.25	1%	2	1	Nil	No Growth
Mahalexmi	1145678	33	F	160	58	22.66	BAL	Nil	Nil	Nil	Normal	Non-Smoker	Nil	Negative	106	100	70	16	96 in RA	140	106	78	20	94 in RA	108	100	70	18	96 in RA	146	110	70	20	94 in RA	144	110	70	20	94 in RA	20	20	22	50mcg Fentanyl	5ml	53.25	1%	1	1	Nil	Growth+
Sittavva	1199626	45	F	154	50	21.05	BAL	Nil	Nil	Nil	Normal	Non-Smoker	Dust allergy	Negative	80	150	90	16	99 in RA	99	150	90	18	90 in RA	92	150	90	16	96 in RA	92	150	90	28	92 inRA	102	150	90	18	92 in RA	10	10	17	50mcg Fentanyl	10ml	213	2%	0	1	Nil	No Growth
Rudravva	1125672	45	F	156	50	20.48	BAL	HTN,T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	70	110	70	24	98 in RA	92	120	80	30	98 in 2l O2	88	120	80	28	98 in RA	94	120	80	30	98 in 2L O2	94	120	80	30	98 in 2L O2	20	20	21	50mcg Fentanyl	20ml	426	2%	1	1	Bronchospasm	No Growth
Chandrayya	1165476	56	M	168	50	17.72	BAL	T2DM	Renal Calculi	Appendicectomy	loss of appetite	Smoker	Nil	Negative	89	120	80	20	98 in 2L O2	66	110	70	30	88 in 5L O2	76	120	80	26	94 in 5L O2	68	120	80	30	88 in 5L O2	68	120	80	30	88 in 5L O2	20	20	20	50mcg Fentanyl	10ml	53.25	1%	1	2	Bronchospasm	Growth+
Priyanka	1112490	23	F	156	43	17.71	BAL	Nil	MDRTB	Nil	Normal	Non-Smoker	Nil	Negative	94	110	70	18	99 in RA	120	120	70	24	98 in RA	100	120	70	22	98 in RA	120	120	70	24	98 in RA	120	120	70	24	98 in RA	20	20	24	50mcg Fentanyl	5ml	53.25	1%	1	1	Nil	No Growth

Mohamaidhure	1114509	51	M	175	65	21.22	BAL	Nil	PTB	Nil	loss of appetite, Tobacco Chewer , Alcoholic	Smoker	Nil	Negative	94	110	70	22	98 in RA	108	120	70	30	98 in 5L O2	104	120	70	26	96 in RA	108	120	70	30	98 in 5L O2	108	120	70	30	98 in 5L O2	15	15	17	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	Growth+
Lata	1209823	50	F	156	65	26.67	BAL	T2DM, Hypothyrodism	PTB	LSCS	Normal	Non-Smoker	Nil	Negative	98	130	80	18	99 in RA	100	130	80	24	99 in 3L O2	80	130	80	22	98 in RA	100	130	80	24	99 in 3L O2	100	130	80	24	98 in 3L O2	10	10	10	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+
Indumati	1159685	63	F	155	55	22.85	BAL	HTN	PTB	LSCS	Normal	Non-Smoker	Dust allergy	Negative	82	130	80	22	99 in RA	120	140	80	26	99 in 5L O2	110	140	80	23	96 in RA	120	140	80	26	99 in 5L O2	120	140	80	26	99 in 3L O2	20	25	21	50mcg Fenatnyl	10ml	106.5	1%	1	2	Nil	Growth+
Rekha	7156127	57	F	160	44	17.19	BAL	HTN	PTB	Nil	Normal	Non-Smoker	Dust allergy	Negative	100	120	80	20	98 in RA	124	130	80	28	98 in 10L O2	120	130	80	28	98 in 3L O2	124	130	80	28	98 in 10L O2	128	130	80	28	98 in 10L O2	30	30	29	50mcg Fentanyl	10ml	213	2%	1	2	Bronchospam	No Growth
Madivaleppa	1178157	48	M	164	60	22.29	BAL	T2DM	PTB	Nil	Alcoholic	Smoker	Nil	HbsAg+	88	120	80	22	98 in RA	110	120	80	28	98 in 2l O2	100	120	80	26	98 in RA	120	120	80	28	98 in 2L O2	120	120	80	28	98 in 2L O2	10	10	16	50mcg Fentanyl	10ml	213	2%	0	1	Nil	Growth+
Maruti	1178353	51	M	170	63	21.8	TBLB, BAL	HTN,T2DM	Nil	Nil	loss of appetite,tobacco Chewer , Alcoholic	Smoker	Nil	Negative	80	130	80	20	96 in RA	98	130	80	26	98 in 3L O2	90	130	80	24	94 in RA	98	130	80	26	98 in 3L O2	100	130	80	26	98 in 3L O2	20	20	24	100mcg Fentanyl	10ml	213	2%	1	2	Bronchospasm	No Growth
Channapa	1178325	65	M	176	64	20.63	BAL	HTN	Nil	Nil	loss of appetite	Smoker	Nil	Negative	96	150	90	18	96 in RA	120	150	90	26	98 in 3L O2	110	150	90	23	94 in RA	120	150	90	26	98 in 3L O2	120	150	90	26	98 in 3L O2	15	20	16	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Govind	1181037	61	M	171	70	23.91	BAL	T2DM	Nil	Nil	Normal	Smoker	Nil	Negative	72	130	80	16	98 in RA	90	120	80	22	98 in RA	84	130	80	19	97 in RA	90	130	80	22	98 in RA	90	130	80	22	98 in RA	20	20	21	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+
Rupali	1190333	40	F	157	55	22.38	BAL	T2DM	Nil	Nil	loss of appetite	Non-Smoker	Nil	HIV+	100	130	80	22	94 in RA	124	140	80	30	98 in 5L O2	110	140	80	24	98 in 2L O2	120	140	80	28	98 in 5L O2	124	140	80	30	98 in 5L O2	30	30	26	50mcg Fentanyl	10ml	213	2%	1	2	Bronchospasm	No Growth
Holappa	1190844	38	M	168	48	17.01	BAL	Nil	PTB	Nil	loss of appetite, Tobacco Chewer , Alcoholic	Smoker	Dust allergy	Negative	78	110	70	20	96 in RA	100	120	80	28	98 in 3L O2	94	120	80	24	98 in 2L O2	100	120	80	28	98 in 3L O2	100	130	80	28	98 in 3L O2	20	20	26	50mcg Fentanyl	10ml	106.5	1%	1	2	Nil	Growth+
Anjana	1191467	50	F	157	38	15.39	BAL	Nil	Nil	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	80	120	80	21	95 in RA	102	120	80	27	98 in 5L O2	94	130	80	23	98 in 2L O2	104	120	80	27	98 in 5L O2	122	130	80	28	98 in 5L O2	17	20	18	50mcg Fentanyl	10ml	213	2%	1	1	Nil	Growth+
Sanjeev	7068725	50	M	168	90	31.86	TBLB, BAL	Nil	PTB	Nil	loss of appetite	Smoker	Nil	Negative	102	110	80	22	96 in RA	136	120	80	28	92 in RA	120	120	80	26	94 in RA	136	120	80	28	92 in RA	134	120	80	28	92 in RA	20	20	26	50mcg Fentanyl	10ml	106.5	1%	1	2	Nil	Growth+
Swati	1208148	18	F	156	42	17.25	BAL	Nil	PTB	Nil	loss of appetite, loss of weight	Non-Smoker	Nil	Negative	90	110	70	22	96 in RA	130	120	80	28	92 in RA	110	120	80	26	94 in RA	132	120	80	28	92 in RA	132	120	80	28	92 in RA	20	20	20	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospam	No Growth
Bassapa	1266228	58	M	167	66	23.69	BAL	T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	84	120	80	22	97 in RA	120	120	80	26	94 in RA	104	120	80	26	94 in RA	120	120	80	26	94 in RA	122	120	80	26	94 in RA	15	15	14	50mcg Fentanyl	10ml	213	2%	1	1	Nil	No Growth
Pundalik	1259021	34	M	170	56	19.38	BAL	Nil	PTB	Nil	loss of appetite,loss of weight	Smoker	Nil	Negative	98	110	80	20	98 in RA	110	120	80	24	98 in RA	104	120	80	22	98 in RA	110	120	80	24	98 inRA	112	120	80	24	98 in RA	20	20	24	50mcg Fentanyl	10ml	106.5	1%	1	2	Nil	No Growth
Rajeshwari	1204562	48	F	154	45	18.81	BAL	Nil	PTB	Nil	Loss of appetite	Non-Smoker	Nil	Negative	98	120	80	24	96 in RA	120	130	80	29	98 in 2l O2	112	130	80	26	98 in 1L 02	124	130	86	28	98 in 2L O2	124	130	84	29	98 in 2L O2	25	25	23	50mcg Fentanyl	10ml	106.5	1%	1	2	Bronchospasm	No Growth
Jakeera	10001289	38	F	155	46	19.09	BAL	T2DM	Nil	Nil	loss of appetite	Non-Smoker	Nil	Negative	100	130	84	26	88 in RA	124	140	90	30	98 in 8L O2	110	140	80	28	98 in 5L O2	126	140	90	29	98 in 8L O2	124	140	90	30	98 in 8L O2	20	20	18	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	Growth+
Ismail	1250923	45	M	168	58	20.56	BAL	Nil	PTB	Nil	loss of appetite	Smoker	Nil	Negative	88	120	80	22	97 in RA	98	124	80	24	95 in RA	92	120	80	22	96 in RA	98	120	80	24	95 in RA	96	120	80	23	95 in RA	20	20	18	50mcg Fentanyl	10ml	106.5	1%	1	2	Nil	No Growth
Suresh	12006734	46	M	170	52	18.04	BAL	Nil	PTB	Nil	loss of appetite,loss of weight	Smoker	Nil	Negative	98	110	70	22	95 in RA	124	120	70	26	96 in 2L O2	108	114	70	24	94 in RA	122	120	70	26	96 in 2L O2	122	120	70	26	96 in 2L O2	20	20	21	50mcg Fenatnyl	10 ml	106.5	1%	1	2	Nil	No Growth
Bhagyasgri	10001204	45	F	156	46	18.85	TBLB, BAL	Nil	Nil	LSCS	Normal	Non-Smoker	Nil	Negative	86	110	74	21	94 in RA	104	120	74	26	96 in 2L O2	98	114	70	24	96 in 1L O2	106	120	74	26	96 in 2L O2	104	120	70	26	96 in 2L O2	15	15	14	50mcg Fentanyl	10ml	213	2%	0	1	Nil	No Growth
Nikhil	10002124	36	M	170	48	16.59	BAL	Nil	Nil	Nil	loss of appetite	Smoker	Nil	Negative	88	120	80	20	96 in RA	110	120	80	24	94 in RA	100	120	80	22	95 in RA	112	120	80	24	94 in RA	112	120	80	24	94 in RA	20	15	21	50mcg Fentanyl	10ml	106.5	1%	0	1	Nil	No Growth
Shivamma	10001595	77	F	156	64	26.3	BAL	HTN,T2DM	Nil	Nil	loss of appetite	Non-Smoker	Nil	Negative	92	130	84	24	95 in 3L O2	114	140	88	28	98 in 8L O2	100	138	88	26	95 in 5L O2	116	140	90	28	98 in 8L O2	116	140	90	28	98 in 8L O2	20	20	21	50mcg Fentanyl,1 mg Midazolam	10ml	213	2%	1	1	Bronchospasm	No Growth
Monisha	10004660	34	F	155	56	23.26	TBLB, BAL	Nil	Nil	Nil	loss of appetite	Non-Smoker	Nil	Negative	90	110	70	22	96 in RA	120	120	70	27	92 in RA	104	120	70	24	94 in RA	120	120	70	27	92 in RA	120	120	70	27	92 in RA	20	25	21	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Santavva	10004184	60	F	156	63	25.88	BAL	T2DM	Nil	LSCS	Loss of appetite	Non-Smoker	Dust allergy	Negative	98	120	70	24	94 in 3L O2	118	130	70	28	95 in 8L O2	102	120	70	25	95 in 5L O2	118	130	70	28	95 in 8L O2	118	130	70	28	95 in 8L O2	20	20	21	50mcg Fentanyl,1 mg Midazolam	10ml	213	2%	1	2	Bronchospasm	No Growth
Prabhunarayan	10005390	64	M	166	65	23.63	BAL	HTN,T2DM	Nil	Nil	Loss of appetite , loss of weight	Smoker	Nil	Negative	88	120	80	22	96 in RA	112	120	80	28	94 in RA	104	120	80	26	95 in RA	116	120	80	28	94 in RA	118	120	80	28	94 in RA	15	20	23	50mcg Fentanyl	10ml	106.5	1%	1	2	Bronchospasm	No Growth
Laxmi	10006972	45	F	162	53	20.23	TBLB, BAL	T2DM	Nil	Nil	loss of appetite	Non-Smoker	Dust allergy	Negative	90	120	70	20	98 in RA	114	120	80	24	95 in RA	102	120	80	22	96 in RA	114	120	80	24	96 in RA	114	120	80	24	96 in RA	10	10	5	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	Growth+
Shankar	10007616	61	M	170	64	22.15	TBLB, BAL	T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	84	130	80	24	98 in RA	114	140	80	28	94 in 3L O2	106	130	80	24	94 in RA	126	140	80	28	94 in 3L O2	114	140	80	28	94 in 3L O2	15	15	17	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth
Gangappa	10006696	56	M	172	65	21.96	BAL	T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	86	120	70	24	94 in RA	104	130	70	28	98 in 4L O2	94	124	70	24	96 in 2L O2	106	130	70	28	98 in 4L O2	106	130	70	28	98 in 4L O2	15	15	18	50mcg Fentanyl	10ml	213	2%	1	1	Nil	Growth+
Mangala	10007639	45	F	159	53	20.99	BAL	T2DM	Nil	LSCS	loss of appetite	Non-Smoker	Nil	Negative	84	120	70	22	98 in RA	112	130	70	26	95 in RA	98	126	70	24	96 in RA	112	130	70	26	95 in RA	112	130	70	26	95 in RA	15	15	14	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth
Basavva	10008110	56	F	154	45	18.81	TBLB, BAL	Nil	Nil	Nil	loss of appetite	Non-Smoker	Nil	Negative	88	120	70	22	94 in RA	104	124	70	28	98 in 4L O2	94	120	70	24	96 in 2L O2	104	124	70	28	98 in 4L O2	104	124	70	28	98 in 4L O2	15	15	18	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Babu	10007488	37	M	172	56	18.98	BAL	Nil	Nil	Nil	loss of appetite	Smoker	Nil	Negative	114	110	70	23	94 in RA	136	120	70	27	98 in 5L O2	124	120	70	25	96 in 2L O2	136	120	70	27	98 in 5L O2	136	120	70	27	98 in 5L O2	20	20	24	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth
Ambalappa	10007512	53	M	171	58	19.86	BAL	Nil	Nil	Nil	loss of appetite	Smoker	Nil	Negative	92	120	80	20	99 in RA	98	120	80	24	98 in RA	94	120	80	20	98 in RA	98	120	80	24	98 in RA	98	120	80	24	98 in RA	10	10	17	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth

Jotiba	10016236	54	F	156	58	23.74	BAL	Nil	Nil	LSCS	loss of appetite	Non-Smoker	Nil	Negative	72	120	80	21	97 in RA	98	120	89	27	94 in RA	82	120	80	24	95 in RA	98	120	80	27	94 in RA	100	120	80	27	94 in RA	10	10	18	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	Growth+	
Ujwala	10013149	45	F	153	45	19.2	BAL	Nil	PTB	Nil	loss of appetite, loss of weight	Non-Smoker	Dust allergy	Negative	110	114	70	23	96 in RA	130	120	74	29	94 in 3L O2	114	120	74	25	94 in 2L O2	128	120	74	28	94 in 3L O2	120	130	74	29	94 in 3L O2	20	30	32	50 mcg Fentanyl,0.5 mg Midazolam	10ml	106.5	1%	1	2	Bronchospasm	No Growth	
Renuka	100177827	43	F	154	51	21.46	BAL	Nil	PTB	LSCS	loss of appetite	Non-Smoker	Nil	Negative	93	120	70	21	99 in RA	110	124	70	25	96 in RA	100	120	70	22	97 in RA	112	124	70	25	96 in RA	112	124	70	25	95 in RA	10	10	17	50 mcg Fentanyl	10ml	106.5	1%	0	1	Nil	No Growth	
Ramesh	10020402	33	M	172	64	21.63	TBLB, BAL	Nil	Nil	Nil	loss of appetite	Smoker	Nil	Negative	70	100	70	22	95 in RA	92	100	70	25	92 in RA	82	100	70	23	94 in RA	94	100	70	25	92 in RA	92	100	70	25	92 in RA	5	10	15	50mcg Fentanyl	10ml	213	2%	0	1	Nil	Growth+	
Jayaram	10014454	72	M	174	67	22.07	BAL	HTN,T2DM	Nil	Nil	Normal	Smoker	Nil	Negative	78	130	80	20	98 in RA	94	140	80	25	94 in RA	84	134	80	23	95 in RA	92	140	80	25	94 in RA	94	140	80	25	94 in RA	15	15	18	50mcg Fentanyl	10ml	106.5	1%	1	1	Nil	No Growth	
Basavanneppa	10014951	86	M	173	60	20.04	TBLB, BAL	T2DM	PTB	Nil	loss of appetite	Smoker	Nil	Negative	88	130	80	24	94 in 4L O2	112	140	80	28	94 in 8L O2	102	134	80	25	94 in 5L O2	112	140	80	28	94 in 8L O2	112	140	80	28	94 in 8L O2	20	20	34	50mcg Fentanyl,1 mg Midazolam	10ml	106.5	1%	1	1	Bronchospasm	Growth+	
Gurulingayya	7220058	66	M	169	58	20.35	TBLB, BAL	HTN,T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	100	130	80	22	98 in RA	124	140	80	27	94 in RA	108	130	80	24	95 in RA	124	140	80	27	95 in RA	124	140	80	27	94 in RA	10	15	14	50mcg Fentanyl	10ml	213	2%	1	1	Bronchospasm	No Growth	
Avanna	10045721	80	M	167	60	21.51	TBLB, BAL	T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	90	110	70	21	92 in RA	114	120	70	25	94 in 4L O2	102	120	70	23	93 in RA	114	120	70	25	94 in 4L O2	114	120	70	25	94 in 4L O2	10	10	15	50mcg Fenatnyl	10ml	213	2%	1	1	Bronchospasm	No Growth	
Anand	7238875	54	M	172	62	20.97	TBLB, BAL	HTN,T2DM	Nil	Nil	loss of appetite	Smoker	Nil	Negative	113	120	80	22	98 in RA	124	120	80	27	94 in RA	116	120	80	23	95 in RA	124	120	80	27	94 in RA	124	120	80	27	94 in RA	10	10	14	50mcg Fentanyl	10ml	213	2%	0	1	Bronchospasm	No Growth	
Bharmani	7239963	50	M	171	64	21.91	TBLB, BAL	T2DM, HTN,IHD	Nil	Nil	loss of appetite	Smoker	Nil	Negative	90	140	80	24	95 in RA	112	140	80	28	98 in 5L O2	106	140	70	25	92 in RA	112	140	80	28	98 in 5L O2	112	140	80	27	98 in 5L O2	10	10	16	50mcg Fentanyl	10ml	213	2%	0	1	Nil	Growth+	