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THE POTENCY OF ANESTHESIA IN SURGICAL OPERATION: EXPLORING THE ROLES AND NEGATIVE EFFECTS ON HUMAN HEALTH

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Abstract: Anesthesia remains a critical component of modern surgical practice, providing pain control, muscle relaxation, and loss of consciousness necessary for safe and effective surgical interventions. This paper explored the potency of anesthesia by examining its essential roles in surgical operations and assessing the potential negative effects on human health. The study adopted descriptive survey design. The research was carried out in Akwa Ibom State Nigeria. The population of the study comprised of all Medical Doctors, Nurses and Physical Health Personnel. The study used a sample size of 150 respondents, a total of 50 Doctors, 50 Nurses and 50 Physical Health Personnel was used. The instrument used for the data collection was a structured questionnaire titled: "The Potency of Anesthesia in Surgical Operation Questionnaire" Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.73, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive analysis to answer research questions. The study highlighted how various anesthetic agents facilitate operative precision, reduce intraoperative stress responses, and enhance patient outcomes. However, it also identified the negative effects such as postoperative nausea, respiratory depression, neurocognitive impairment, cardiovascular instability, and rare but serious complications like malignant hyperthermia. Furthermore, the abstract underscore the importance of proper dosing, patient assessment, and continuous monitoring in minimizing anesthesia-related risks. The potency of anesthesia lies in its ability to balance therapeutic benefits with potential health hazards, emphasizing the need for skilled administration and evidence-based clinical practices.The study concluded that the ability of anesthesia to provide efficient analgesia, muscle relaxation, and sedation is crucial to the outcome of surgical procedures. When administered precisely, it minimizes patient discomfort and enables surgeons to safely conduct difficult surgeries.One of the recommendations made was that patient age, comorbidities, and physiological status should be assessed to tailor anesthetic potency and minimize adverse effects.

Key Words: Anesthesia, Surgical Operation, Human Health.

INTRODUCTION

Anesthesia is essential to modern medicine because it makes surgery and other medical procedures painless. This essay examines the many uses of anesthetic, as well as its types, health risks, and administration

difficulties. Often referred to as the "gift of oblivion," anesthesia has completely changed the field of medicine by enabling the painless performance of previously unimaginable surgeries and treatments.

This study explores the many uses of anesthesia, clarifies its effectiveness and its drawbacks, and reveals the ongoing difficulties anesthesiologists encounter in their quest to strike a balance between patient comfort and safety. Anesthesia is a silent protector in the constantly changing world of medicine, enabling complex surgical procedures, reducing pain, and giving patients enduring a variety of medical procedures a cocoon of oblivion. Anesthesia plays a crucial role in shaping the trajectory of human healthcare, enabling professionals to navigate the delicate balance between pain management and patient welfare.According to Khan (2023), surgical anesthesia is the cornerstone of contemporary surgery, giving patients undergoing a variety of medical procedures a regulated and reversible state of unconsciousness. By reducing pain perception and fostering physiological stability throughout the procedure, the main goal is to guarantee the patient's comfort.

Although anesthesia has a long history, the advent of ether and chloroform in the 19th century marked the beginning of contemporary anesthetic therapy. Surgeons were able to undertake invasive procedures without causing patients excruciating pain thanks to these early medications. Over the course of the 20th century, developments in pharmacology and physiology led to the creation of safer and more effective medications, such as inhalational and intravenous anesthetics and adjunct medications that maximize sedation, analgesia, and muscle relaxation (Butterworth, Mackey, &Wasnick, 2018). Anesthesia is now seen as a vital part of contemporary medicine, supporting treatments in dentistry, obstetrics, critical care, and diagnostic medicine in addition to surgical interventions.

Anesthetics function by preventing nerve impulses from traveling via the central and peripheral neural systems. While general anesthetics work on several receptor systems, such as GABA (gamma-aminobutyric acid) and NMDA (N-methyl-D-aspartate) receptors, to reduce central nervous system activity, local anesthetics mainly block voltage-gated sodium channels (Nagelhout&Plaus, 2022). While muscle relaxants aid in immobility during surgery, sedatives increase inhibitory neurotransmission, resulting in anxiolysis and forgetfulness.

Anesthesia needs be adequately distributed to all corners and on time to avert the implication of delays. The implication of delay is always devastating as it happened in numerous pandemics like those of Covid-19, Ebola disease and many more. During Covid-19, global factories shut down, and transportation slowed, reducing the availability of important anesthesia medications in hospitals and this hampered wide dissemination of drugs. As noted by Arisekola, (2023) the Covid-19 pandemic affected a variety of things, including supply chain operations, tier relationships, firm policies, and networks of interrelated linkages. This disruption further complicated the administration and accessibility of anesthesia worldwide, introducing new challenges to an already delicate medical practice.

The area is driven ahead by the requirement for adaptability and ongoing technical breakthroughs, which necessitate a constant quest for knowledge and skill improvement. We are attempting to make our way through the hallways of anesthesia, investigating its uses, comprehending the complexities of its adverse effects, and studying the enduring issues that influence this vital aspect of contemporary medicine. We hope to shed light on the challenges, successes, and continuous progress in the field of anesthesia through this trip.

Statement of the Problem

Despite the essential role of anesthesia in enabling painless and successful surgical operations, concerns continue to rise about its negative effects on human health. Many patients experience postoperative complications such as nausea, dizziness, memory loss, and delayed recovery, yet these issues are often poorly understood. In severe cases, anesthesia may trigger respiratory depression, allergic reactions, or

long-term cognitive impairment, creating safety risks during and after surgery. Additionally, variations in patient age, body system response, and underlying medical conditions further complicate anesthesia outcomes. Limited awareness of these risks among patients contributes to avoidable fear and misconceptions. There is also insufficient research attention on how different anesthesia types influence health outcomes. Therefore, it becomes necessary to investigate both the potency and the potential hazards of anesthesia in modern surgical practice.

Research questions

1. What are roles of anesthesia in surgical operation?
2. What are the negative effects of anesthesia in human health?
3. What are the remedies to the negative effects of anesthesia in human health?

Objectives of the study

1. To find out the roles of anesthesia in surgical operation
2. To examine the negative effects of anesthesia in human health
3. To investigate the remedies to the negative effects of anesthesia in human health

LITERATURE REVIEW

Concept of Anesthesia

Anesthesia is a reversible, medically produced state of insensitivity to pain and other stimuli. It can also cause forgetfulness, muscle relaxation, and awareness suppression. By removing pain, discomfort, and involuntary movements, it is mostly used to make surgical, diagnostic, or therapeutic operations easier. According to Morgan, Mikhail, and Murray (2019), the name "anesthesia" literally means "without sensation" and is derived from the Greek terms an- (without) and aisthesis (sensation). Anesthesia has developed over time from simple techniques employing alcohol and herbal remedies to complex pharmaceuticals that can precisely regulate consciousness and bodily processes.

Anesthesia is essential in a variety of medical contexts. It allows for painless intrusive procedures in surgery. Local and topical anesthesia are used in dentistry to facilitate extractions and restorations. Epidurals and other forms of obstetric anesthesia guarantee a safe and comparatively painless birth. Sedation and local anesthesia enhance patient compliance and comfort during diagnostic procedures such as endoscopy and radiographic interventions (Hines &Marschall, 2021). Furthermore, by guaranteeing immobility and lowering metabolic demand, anesthesia makes critical care operations like mechanical ventilation easier.

Anesthesia has inherent hazards, such as respiratory depression, hypotension, allergic reactions, and, in rare cases, anesthesia awareness under general anaesthesia, despite its vital purpose. In order to reduce difficulties, modern anesthetic treatment places a strong emphasis on ongoing monitoring, customized dosage, and attention to safety procedures (Morgan et al., 2019). Anesthesia is now one of the safest parts of contemporary medicine thanks to advancements in pharmacology, monitoring technology, and professional training.

A fundamental component of contemporary therapeutic practice, anesthesia enables patients to undergo operations that would otherwise be unbearable. Anesthesia offers targeted and systemic pain control, consciousness modulation, and muscle relaxation in local, regional, general, sedative, and topical forms. Anesthesia is still safe, effective, and essential to patient care thanks to the development of anesthetic procedures and a thorough grasp of pharmacology and physiology.

Concept of Surgical Operation

A surgical operation is an invasive, planned medical procedure in which trained professionals deliberately gain access to the body using specialized instruments to diagnose, treat, or prevent disease. Access is usually obtained through an incision in the skin but may also be achieved via natural orifices (such as the mouth or urethra) or through percutaneous punctures, depending on the type of procedure. In all cases, the aim is to repair tissue damage, arrest or control disease processes, remove pathological structures (such as tumours or inflamed organs), or place implants that restore or improve function (Yang et al., 2018; Yu et al., 2021).

Modern concepts of surgical operation emphasises that surgery involves crossing the body's natural barriers in a controlled and safe manner. By definition, a surgical operation violates natural body boundaries—most commonly the skin, but also the walls of the gastrointestinal and genitourinary tracts—under carefully managed conditions such as asepsis, haemostasis, and anaesthesia (Bass et al., 2014). These procedures are performed in specialized environments like operating theatres, where sterility, surgical technique, and perioperative care are all coordinated to reduce the risk of complications and promote healing.

A**surgical operation** can also be defined as *"a set of medical actions that involve cutting, removing, repairing, or reconstructing tissues or organs through an operative approach, performed by a surgeon under controlled aseptic conditions, usually with the aid of anesthesia and specialized instruments, in order to cure disease, relieve symptoms, or improve bodily function"*(Smelt & Harris, 2019). This definition emphasises that surgery is a **planned, invasive intervention** that combines technical skill, sterile technique, and perioperative care to achieve a therapeutic goal for the patient.

Furthermore, a surgical operation is understood not only as the act of cutting and suturing but as part of a broader perioperative process that includes preoperative assessment, intraoperative management, and postoperative care. Appropriate use of antimicrobial drugs, pain control, monitoring, and rehabilitation all contribute to the success of an operation and the overall outcome for the patient (Yang et al., 2018). In this way, the concept of surgical operation reflects a complex, multidisciplinary intervention designed to restore function, relieve symptoms, and improve the patient's quality of life (Yu et al., 2021; Bass et al., 2014).

Concept of Human Health

Human health is a multidimensional concept that encompasses the physical, mental, social, and, increasingly, environmental and spiritual aspects of a person's well-being. It goes beyond the mere absence of disease to include a state of complete wellness that supports individuals in leading productive and fulfilling lives. According to the World Health Organization (WHO), health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity a definition that emphasizes the holistic nature of human well-being and remains foundational in global health discourse (World Health Organization, 2020).

From a medical and biological standpoint, human health is shaped by the proper functioning of the body's systems and the resilience of physiological processes. McPhee and Hammer (2021) assert that human health involves the maintenance of bodily functions within normal ranges, supported by homeostasis, adequate nutrition, and resistance to disease. Their perspective highlights that physical well-being relies on biological integrity as well as preventive and corrective healthcare practices.

Beyond the biological dimension, human health also includes psychological well-being. According to Taylor (2021), mental health is an essential component of overall health, involving emotional stability, cognitive functioning, coping ability, and the capacity to maintain meaningful relationships. Taylor notes that mental health challenges such as anxiety, depression, and stress disorders can impair overall well-being even when physical health is intact, reinforcing the interconnected nature of the health dimensions.

Social well-being also plays a critical role. Marmot (2020) explains that social determinants such as income, education, housing, employment, and community support—significantly influence human health. He emphasizes that disparities in social conditions lead to unequal health outcomes, making health not only a medical issue but also a social and economic one. This viewpoint recognizes that individual health is deeply shaped by external environments and societal structures.

Additionally, contemporary health scholars stress the importance of environmental factors. Frumkin (2021) argues that human health is inseparable from environmental conditions such as air quality, water safety, climate stability, and exposure to pollutants. He notes that environmental degradation and climate change have emerged as major global health threats, demonstrating that human health must be understood within the larger context of ecological sustainability. Nutritional deficiency is also a major global health challenge, also known as malnutrition, Kunlere and Peter (2025) stated thatmalnutrition has severe consequences on human health, affecting physical and cognitive development, immune function, and overall well-being. `

Types of Anesthesia used for chemical Purpose

Anesthesia, which is used to prevent pain during clinical, dental, or chemical operations, is a medically induced lack of feeling. Depending on the complexity of the procedure and the level of pain control needed, many types of anesthesia are used in chemical or laboratory-related medical situations, including small surgeries, invasive chemical tests, endoscopic procedures, and drug delivery (Butterworth et al., 2018).

Local Anesthesia: A particular, little area of the body's nerve conduction is momentarily blocked during local anesthesia. According to Nagelhout and Plaus (2022), it is frequently utilized for minor chemical procedures like biopsies, dental fillings, minor wound suturing, and dermatological chemical treatments. By blocking sodium channels in nerve membranes, local anesthetics like lidocaine, benzocaine, and bupivacaine stop pain from being transmitted (Morgan et al., 2019).Example chemical applications**:**Skin chemical peels, Local tissue biopsies, Injection-based chemical treatments

Regional Anesthesia: Regional anesthesia targets major nerves or nerve bundles to numb a greater portion of the body. Chemical infusions, limb surgeries, obstetric treatments, and lower abdominal operations are among the procedures that frequently employ it (Hines &Marschall, 2021). The three main varieties are nerve block, epidural, and spinal anesthesia.Example chemical applications:Epidural infusion of analgesic chemicals in labor, Regional blocks during chemical debridement of wounds, Limb surgeries involving chemical irrigation or fixationRegional anesthesia is favored for reducing systemic drug toxicity compared to general anesthesia (Brown et al., 2018).

General Anesthesia: Complete lack of consciousness and feeling is the result of general anesthesia. According to Nagelhout and Plaus (2022), it is necessary for major chemical or surgical procedures that involve extensive tissue manipulation, exposure to harmful chemicals, airway control, or internal organ access. Inhaled drugs like isoflurane and sevoflurane, as well as intravenous drugs like ketamine and protocol, are examples of general anesthetics.Example chemical applications:Major surgeries using chemical disinfectants or fixatives, internal organ procedures involving chemical agents. Operations requiring muscle relaxation for chemical cauterization. General anesthesia ensures immobility, controlled respiration, and complete analgesia (Morgan et al., 2019).

Sedation (Conscious, Deep, or Procedural Anesthesia): A modified state of lowered consciousness known as sedation is employed in operations that don't require complete anesthesia but do require pharmacological agents. To lessen anxiety, induce forgetfulness, and lessen pain perception, sedatives including midazolam, propofol, and fentanyl are utilized (Hines &Marschall, 2021).Example chemical applications:Endoscopies using chemical dyes, Minor dental or dermatologic chemical procedures, Chemical debridement of wounds. Sedation is preferred for procedures that require cooperation but minimal discomfort (Butterworth et al., 2018).

Topical Anesthesia: Topical anesthesia involves applying an aestheticchemical to the skin or mucous membranes. It is used where surface chemical procedures cause discomfort, such as chemical cauterization, superficial biopsies, or endoscopic chemical dye application (Brown et al., 2018). Agents include lidocaine creams, benzocaine sprays, and tetra Caine gels.

Example chemical applications: Chemical cautery (e.g., silver nitrate application), superficial chemical wound treatment, ophthalmic chemical procedures.

The potency of Anesthesia in Patients

The potency of anesthesia refers to its ability to induce the desired depth of sedation, analgesia, or unconsciousness with minimal adverse effects. Anesthetic agents work by suppressing neural activity, particularly in pathways that transmit pain or maintain consciousness. The effectiveness of these agents has advanced significantly since the 20th century due to improved pharmacology and monitoring technologies. According to Brown et al. (2018), modern anesthetics act through specific molecular targets such as GABA receptors and NMDA receptors, leading to controlled and reversible loss of sensation. In clinical practice, the potency of anesthesia is influenced by patient characteristics such as age, weight, organ function, and co-existing medical conditions. Elderly patients, for example, often require lower doses due to reduced metabolic rates and increased drug sensitivity (Makary& Daniel, 2016). Conversely, younger or obese patients may need higher or adjusted doses to achieve the same anesthetic depth. These individual variations highlight the need for personalized anesthetic plans to ensure optimal efficacy and safety.

Another key factor affecting anesthetic potency is the type of procedure being performed. Major surgeries such as cardiac or neurosurgical operations demand deeper and more prolonged anesthesia compared to minor outpatient procedures. Inhalational anesthetics like sevoflurane and intravenous agents such as propofol remain widely used because of their predictable potency and rapid onset (Butterworth et al., 2020). The ability to titrate these agents based on surgical stimuli makes them highly valuable in diverse clinical settings.

Advancements in monitoring technologies have also strengthened the potency and safety of anesthesia. Tools such as the Bispectral Index (BIS) monitor allow anesthesiologists to measure the depth of anesthesia in real time, reducing the risks of intraoperative awareness and overdose. According to Mashour et al. (2021), improved monitoring has led to significant reductions in anesthetic complications and enhanced patient outcomes. These innovations ensure that anesthetic potency is achieved precisely and safely during procedures. Ultimately, the potency of anesthesia lies not only in the pharmacological strength of the agents but also in the skill of the healthcare provider administering them. Proper dosing, monitoring, and patient assessment ensure that anesthesia achieves its intended purpose with minimal risks. As research continues to evolve, new agents and technologies will likely further enhance the potency and safety of anesthesia in clinical practice, improving patient comfort and surgical success.

The Roles of Anesthesia in Surgical Operation

Below are the main roles anesthesia plays in modern surgery:

Produce hypnosis (unconsciousness) and amnesia: Anesthesia renders patients unconscious and prevents recall of surgery so procedures that would be intolerable awake can be performed safely. This is one of the primary goals of general anesthesia.

Provide intra- and postoperative analgesia (pain control): Anesthetic techniques (systemic opioids, regional blocks, local infiltration, multimodal analgesia) block nociception during surgery and reduce early postoperative pain, lowering opioid needs and improving recovery. Contemporary reviews emphasize analgesia as a core anesthetic function (Smith et al., 2023).

Produce muscle relaxation and immobility: Neuromuscular blocking agents and regional techniques allow surgeons adequate relaxation (easier exposure, safer instrument use) and prevent patient movement during delicate portions of the operation. Proper use and reversal of relaxants are critical to safety.

Secure and manage the airway and ventilation: Anesthetists control the airway (intubation, supraglottic devices) and ventilator support, which is essential for many operations and for protecting the lungs from aspiration or hypoxia.

Maintain hemodynamic and physiologic stability: Anesthesia teams monitor and manage blood pressure, heart rate, fluid balance, temperature and oxygenation; they respond to bleeding, sepsis or other intraoperative instability to keep the patient physiologically safe. Recent perioperative hemodynamic guidance underscores this central duty.

Modulate the surgical stress and inflammatory response: Choice of an aesthetic technique and drugs can blunt the neuroendocrine and inflammatory responses to surgery (which affect pain, metabolism, and complications). According to Ivascu et al. (2024), an aesthetic management influences the stress response and outcomes.

Enable targeted regional anaesthesia and multimodal approaches: Regional (spinal, epidural, peripheral nerve) techniques can replace or supplement general anaesthesia to provide focused analgesia, decrease systemic opioid exposure, and improve recovery—roles emphasized in perioperative-medicine literature.

Improve perioperative patient safety, monitoring and escalation: Anaesthetists provide continuous monitoring (EEG/processed indices, end-tidal CO_2, invasive lines), rapid recognition of complications, and immediate interventions; they also play a growing role in postoperative critical care and acute pain services.

Facilitate optimal surgical conditions (positioning, bloodless field): Through muscle relaxation, control of ventilation and measures such as controlled hypotension or regional blocks, anaesthesia helps create the conditions (immobility, minimized bleeding) surgeons need for visibility and precision; anesthetists also safeguard positioning to prevent pressure or nerve injuries.

Contribute to enhanced recovery and postoperative outcomes: Anesthetic choices (short-acting agents, opioid-sparing techniques, regional analgesia, fluid and temperature strategies) influence recovery times, complication rates and length of stay; perioperative medicine and ERAS (enhanced recovery) literature highlights anesthesia's role in better outcomes.

The Negative effects of Anesthesia in Human Health

Postoperative Nausea and Vomiting (PONV): One of the most common negative effects of anesthesia is postoperative nausea and vomiting. This reaction occurs in up to 30% of patients and is more common in females, nonsmokers, and individuals with a history of motion sickness. General anesthetic agents such as volatile gases and opioids can stimulate the chemoreceptor trigger zone in the brain, leading to nausea after surgery (Apfel et al., 2017). Although typically not life-threatening, PONV causes discomfort and may delay patient recovery.

Respiratory Depression: Some anesthetic agents—especially opioids and sedatives—can significantly suppress breathing. Respiratory depression occurs when the central nervous system slows down, reducing the rate and depth of breathing. This can lead to low oxygen levels, carbon dioxide buildup, and in severe cases, respiratory arrest (Sun et al., 2019). Patients with obesity, sleep apnea, or lung disease are at greater risk and require close monitoring during and after surgery.

Cardiovascular Instability: Anesthesia can affect heart function by lowering blood pressure, altering heart rhythm, or reducing cardiac output. Agents such as propofol and inhalational anesthetics cause vasodilation,

which can lead to hypotension (Sessler&Saugel, 2019). In vulnerable patients—such as those with heart disease—these cardiovascular changes can increase the risk of postoperative complications like arrhythmias or myocardial injury.

Cognitive Dysfunction and Memory Impairment: Postoperative cognitive dysfunction (POCD) is a temporary or sometimes prolonged decline in memory, concentration, or processing speed after anesthesia. It is more common in elderly patients and after major surgeries. According to Evered et al. (2018), general anesthesia may trigger inflammation and neurochemical changes that affect brain function. Although most cases resolve within weeks, some patients—especially older adults—may experience long-term cognitive decline.

Allergic Reactions and Anaphylaxis: Although rare, anesthesia can provoke severe allergic reactions. Medications such as neuromuscular blockers, antibiotics, or latex products used during surgery may trigger immune reactions ranging from skin rashes to full anaphylaxis. Anaphylaxis is a life-threatening emergency characterized by sudden breathing difficulty, swelling, and cardiovascular collapse (Harboe et al., 2005). Rapid diagnosis and treatment are essential to prevent death.

Malignant Hyperthermia: Malignant hyperthermia (MH) is a rare but serious inherited reaction triggered by certain anesthetics like succinylcholine and volatile gases. It causes a sudden increase in body temperature, muscle rigidity, and dangerously high metabolic rates. According to Rosenberg et al. (2015), MH can lead to organ failure and death if not treated immediately with dantrolene. Patients with a family history are advised to undergo genetic testing.

Postoperative Pain and Sore Throat: Endotracheal intubation used during general anesthesia can irritate the airway, resulting in postoperative sore throat, hoarseness, or coughing. Studies show that up to 50% of intubated patients experience throat discomfort after surgery (El-Boghdadly et al., 2016). Although minor, this side effect adds to postoperative distress and can affect swallowing or speech for several days.

Kidney and Liver Stress: Anesthetic drugs are metabolized mainly by the liver and excreted through the kidneys. In rare cases, prolonged or high-dose exposure may contribute to organ stress or toxicity. Halothane, for instance, has been associated with liver injury, while sevoflurane breakdown can affect kidney function in susceptible individuals (Feldman, 2012). Patients with existing organ disease require carefully adjusted doses.

The Remedies to the Negative effects of Anesthesia in Human Health

Preventing and Treating Postoperative Nausea and Vomiting (PONV): Effective remedies for PONV include the use of antiemetic medications such as ondansetron, dexamethasone, or droperidol before or after surgery. Using total intravenous anesthesia (TIVA) with propofol instead of inhalational agents can also significantly reduce nausea (Gan et al., 2020). High-risk patients can benefit from combination antiemetic therapy and adequate hydration to stabilize physiological balance after anesthesia.

Managing Respiratory Depression: Respiratory depression can be minimized by careful dosing of sedatives and opioid-sparing approaches such as multimodal analgesia (using non-opioid pain relievers). Continuous postoperative monitoring—pulse oximetry and capnography—is essential for early detection of breathing problems. In severe cases, reversal agents like naloxone for opioids can restore normal breathing quickly (Overdyk et al., 2016).

Stabilizing Cardiovascular Function: To prevent anesthesia-related blood pressure drops or arrhythmias, anesthesiologists administer intravenous fluids, vasopressors (e.g., phenylephrine), or beta-blockers when necessary. Proper preoperative evaluation of patients with cardiovascular disease helps adjust anesthetic plans to avoid complications. Safe titration of agents like propofol reduces the risk of hypotension (Sessler&Saugel, 2019).

Reducing Cognitive Dysfunction and Memory Impairment: Cognitive decline after anesthesia—especially in elderly patients—can be reduced by avoiding prolonged deep anesthesia, using shorter-acting drugs, and maintaining good oxygenation during surgery. Postoperative cognitive rehabilitation, hydration, and early mobilization also help improve recovery (Evered et al., 2018). Monitoring depth of anesthesia with BIS can prevent unnecessarily deep sedation.

Preventing Allergic Reactions and Anaphylaxis: The best remedy is proactive prevention: obtaining a thorough allergy history before surgery, avoiding known triggers, and performing allergy testing for patients with previous reactions. During surgery, rapid treatment with epinephrine, antihistamines, and corticosteroids is essential for managing anaphylaxis (Harboe et al., 2005). Having emergency protocols and trained staff dramatically improves survival.

Managing Malignant Hyperthermia (MH): Malignant hyperthermia can be prevented by identifying at-risk individuals through genetic testing or family history. During surgery, avoiding triggering agents such as succinylcholine and volatile anesthetics prevents an MH crisis. The primary remedy is rapid administration of dantrolene, which reduces muscle metabolism and stabilizes body temperature (Rosenberg et al., 2015).

Treating Postoperative Sore Throat: A sore throat after intubation can be relieved by warm saline gargles, throat lozenges, and mild analgesics. Using smaller endotracheal tubes, adequate lubrication, and minimizing airway trauma help prevent this complication (El-Boghdadly et al., 2016). Humidified oxygen also reduces airway dryness and irritation.

Protecting Kidney and Liver Function: Patients with kidney or liver disorders require dose adjustments and the avoidance of agents known to stress these organs. Ensuring proper hydration before and after surgery supports organ perfusion. Modern anesthetics like sevoflurane are used cautiously, and blood tests may be conducted postoperatively to monitor organ function (Feldman, 2012). Avoiding prolonged use of high-dose anesthesia reduces metabolic burden.

METHODOLOGY

The study adopted descriptive survey design. The research was carried out in Akwa Ibom State Nigeria. The population of the study comprised of all Medical Doctors, Nurses and Physical Health Personnel. The study used a sample size of 150 respondents, a total of 50 Doctors, 50 Nurses and 50 Physical Health Personnel was used. The instrument used for the data collection was a structured questionnaire titled: “The Potency of Anesthesia in Surgical Operation Questionnaire” Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.73, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive analysis to answer research questions.

RESULTS AND DISCUSSIONS

Research Questions 1

The research question sought to find out the roles of anaesthesia in surgical operation. To answer the research, percentage analysis was performed on the data, (see table 1)

Table 1: Percentage analysis of the roles of anesthesia in surgical operation

ROLES	FREQUENCY	PERCENTAGE
Hypnosis (unconsciousness) and amnesia	20	13.33**
Intra- and postoperative analgesia	18	12.00
Muscle relaxation and immobility	17	11.33
Secure and manage the airway and ventilation	15	10.00
Maintain hemodynamic and physiologic stability	16	10.67
Modulate the surgical stress	14	9.33
Enable targeted regional anaesthesia	13	8.67
Improve perioperative patient safety	15	10.00
Facilitate optimal surgical conditions	12	8.00
Enhanced recovery	10	6.67*
TOTAL	**150**	**100%**

** **The highest percentage frequency**
* **The least percentage frequency**
SOURCE: Field survey

The above table presents the percentage analysis of the roles of anesthesia in surgical operation. From the result of the data analysis, it was observed that "Hypnosis (unconsciousness) and amnesia (13.33%)" was rated the highest percentage of roles of anesthesia in surgical operations while "Enhanced recovery (6.67%)" was rated the least. These findings agree with Ivascu et al. (2024) who stated that anesthesia teams monitor and manage blood pressure, heart rate, fluid balance, temperature and oxygenation and anesthesia renders patients unconscious and prevents recall of surgery so procedures that would be intolerable awake can be performed safely.

Research Questions 2

The research question sought to find out the negative effects of anesthesia in human health. To answer the research, percentage analysis was performed on the data, (see table 2)

Table 2: Percentage analysis of the negative effects of anesthesia in human health

NEGATIVE EFFECTS	FREQUENCY	PERCENTAGE
Postoperative Nausea and Vomiting (PONV)	23	15.33**
Respiratory Depression	22	14.67
Cardiovascular Instability	21	14.00
Cognitive Dysfunction and Memory Impairment	21	14.00
Allergic Reactions and Anaphylaxis	18	12.00
Malignant Hyperthermia	16	10.67
Postoperative Pain and Sore Throat	17	11.33
Kidney and Liver Stress	12	8.00*
TOTAL	**150**	**100%**

** **The highest percentage frequency**
* **The least percentage frequency**
SOURCE: Field survey

The above table presents the percentage analysis of the negative effects of anesthesia in human health. From the result of the data analysis, it was observed that "Postoperative Nausea and Vomiting (PONV) (15.33%)" was rated the highest percentage of negative effects of anesthesia in human health while "Kidney

and Liver Stress (8.00%)" was rated the least. These findings agree with Sessler &Saugel (2019) who stated that anesthesia can affect heart function by lowering blood pressure, altering heart rhythm, or reducing cardiac output.

Research Questions 3

The research question sought to find out the remedies to the negative effects of anesthesia in human health. To answer the research, percentage analysis was performed on the data, (see table 3)

Table 3: Percentage analysis of the remedies to the negative effects of anesthesia in human health

REMEDIES	FREQUENCY	PERCENTAGE
Preventing and Treating Nausea (PONV)	24	16.00**
Managing Respiratory Depression	23	15.33
Stabilizing Cardiovascular Function	21	14.00
Reducing Cognitive Dysfunction	20	13.33
Preventing Allergic Reactions and Anaphylaxis	18	12.00
Managing Malignant Hyperthermia (MH)	17	11.33
Treating Postoperative Sore Throat	16	10.67
Protecting Kidney and Liver Function	11	7.33*
TOTAL	**150**	**100%**

** **The highest percentage frequency**
* **The least percentage frequency**
SOURCE: Field survey

The above table presents the percentage analysis of the remedies to the negative effects of anesthesia in human health. From the result of the data analysis, it was observed that "Preventing and Treating Nausea (PONV) (16.00%)" was rated the highest percentage of remedies to the negative effects of anesthesia in human health while "Protecting Kidney and Liver Function (7.33%)" was rated the least. These findings agree with Overdyk et. al. (2016) who stated that respiratory depression can be minimized by careful dosing of sedatives and opioid-sparing approaches such as multimodal analgesia.

Conclusion

In conclusion, the ability of anesthesia to provide efficient analgesia, muscle relaxation, and sedation is crucial to the outcome of surgical procedures. When administered precisely, it minimizes patient discomfort and enables surgeons to safely conduct difficult surgeries. However, anesthetics' potent pharmacological effects can also have detrimental effects on human health, such as immunological suppression, neurotoxicity, cellular dysfunction, and respiratory or cardiovascular issues. These side effects highlight the significance of individualized anesthetic plans, patient monitoring, and cautious dosage. All things considered, anesthesia is essential in contemporary surgery, but for best results, its potency must be balanced with patient safety.

Recommendation

1. Patient age, comorbidities, and physiological status should be assessed to tailor anesthetic potency and minimize adverse effects.
2. Vital signs, oxygenation, and anesthetic depth should be monitored to prevent overdosage or underdosage and reduce complications.
3. Limitation of the duration and concentration of anesthetics to the minimum is required to achieve surgical goals, particularly in vulnerable populations such as children and the elderly.

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