A STUDY OF SAFETY MEASURES IN ANAESTHETIC PRACTICE IN THE UNIVERSITY OF NIGERIA TEACHING HOSPITAL ENUGU

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Certification

We, the undersigned approved this project to be adequate in scope and quality for the award of Nurse Diploma in Anaesthesia.

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Dedication

This project work is dedicated to my beloved husband; Emmanuel Chika, my son; Emmanuel Ugochukwu, and my friend Anne Nwokoro.

Acknowledgement

I wish to acknowledge the medical director of St. Victoria specialist Hospital, Ekwulobia; Dr. P.I.S. Okafor for his fatherly encouragements to me.

My humble gratitude goes to my project supervisor: Nrs N. C. Onyegbule for her motherly advice and diligent Supervision of this project work which contributed to its success, despite her other engagements.

I also heartily extend my gratitude to the head of my department, Dr (Mrs) F. Akpa. Also, to Dr KLA Izuora, former head of department and Mrs .I.Y. Ezedigbo; the course-co-ordinator school of Anaesthesiology University of Nigeria Teaching Hospital, Enugu. Also to the tutorial and non-tutorial staff of ay department, for their assistance.

However, my sincere gratitude is also to my husband and my son, without whose co-operation, and understanding, this project work would not have been successful.

My special acknowledgement goes to Isaac ali Balami, whose kindly assistance contributed to the success of this study and its write-up.

Morealso, to the west African Health Community for maxing this programme on Post Graduate Nurse-Anaesthesiology possible and noble.

Finally, I must not forget my typist: Augustina Agu whose careful work crowned the accuracy and neatness of this study.

Abstract

The study was conducted on the safety measures in anaesthetic practice in the University of Nigeria Teaching Hospital, Enugu.

Chapter one dealt with the introduction of subject matter, statement of problem, research questions, objectives of study, purpose of study, significance of study. Others were delimitation, scope and historical background of the University of Nigeria Teaching Hospital, Enugu.

Chapter two dealt extensively on necessary literature reviews of safety measures during preoperative, intraoperative, post-operative phases/periods and the safety measures to protect the anesthetists, patients and other theatre users.

Chapter three dealt with the area of study, population of study, sample techniques, instrument of data collection and method of data analysis.

Chapter four dealt with data presentation and analysis.

While chapter five involved the discussion of research findings, summary, conclusion, recommendations, bibliography and questionnaires.

Definition of Terms

Anaesthesia	A state of controllable and reversible unconsciousness with loss of sensation to pain induced by drugs used to facilitate surgery.
Anaesthetic	A drug causing anaesthesia.
Anaesthetist	One who administers anaesthesia.
Anticipate	Look forward to, expect.
Consent	Agreement; permission.
Fetus	The developing baby between the 8th week and end of pregnancy.
Geriatric Patient	Old-aged patient.
Hazards	Risk; danger.
Limitation	point that cannot be passed.
Litigation	Make a claim at a court of law.
Measure	Proceeding; step; plan.
Morbidity	Abnormal or disordered condition.
Mortality	Being liable to die.
Premedication	Different classes of drugs given to surgical patients either the night before or at induction of anaesthesia to modify the effect of anaesthesia.
Practitioner	Professional person.
Questionnaire	List of questions to be answered by group of people, especially to get facts or information about their views.
Safety	Freedom from danger
Ventilation	Move in and out freely.
Volatile	Liquid that easily changes into gas or vapour.

Chapter One Introduction

According to A.S. Hornby (1982) Oxford Advanced Learner's Dictionary of Current English, Safety means being safe; freedom from danger…" and that measure means "proceeding; step equals to plan"…"

However, safety measures in anaesthetic practice are the mapped out actions that bring about freedom from dangers while the anaesthetist carries out his/her duties. Thus, by these actions, the meticulous anaesthetist protects himself, the patient and other team members.

Graham Smith (1990), preoperative Assessment and Premedication, said that, "Inadequate preoperative preparation of the patient may be a major contributory fact to the primary anaesthetic causes of perioperative mortality". He emphasized "that several of the large-scale epidemiological studies have indicated this, hence, the anaesthetist assesses each patients' fitness for anaesthesia, to allow optimum preparation for anaesthesia und surgery. This promotes the patient's safety". This measure is supported by Dr. Orunta (1995).

With reference to Alan R. Aikenhead, (1990) Anaesthetic Apparatus, "anaesthetists have sound knowledge of principles of functioning of the anaesthetic equipment in common use, in order to prevent the adverse events that occur during anaesthesia with great rapidly, and faced with imminent disasters; tras supply of as to the point of delivery to the patient".

David Fell, The Practical conduct of Anaesthesia, said that "Before embarking on the anaesthetic, consideration should be given to the induction and maintenance of anaesthesia, the position of the patient on the operating table, equipment for necessary monitoring, the use of intravenous fluids or blood for infusion, the post-operative care and recovery facilities which will be required.

He should be satisfied that the correct operation is being performed on the correct patient, and that consent has been given. The patient must be on a tilting table and the anaesthetist should have a competent assistant".

According to Alan Rennesd, (1990), the operating Theatre Environment, "measures are taken to promote safety in the operating theatre to prevent the possible occurrence of electrocution, as explosions, risk of pollution of the atmosphere with unaesthetic cases and vapours, contracting infections particularly human immunodeficiency virus or napatitis B., from infected patients". Also that "Environmental controls of varying degrees of complexity, to reduce the risk of airborne infection, services for anaesthetic equipment, artificial lighting appropriate for surgeon and anaesthetist and separate areas for reception and recovery of patients".

According to Dr. KLA Izukora's Lecture (1993) on safety measures in the Theatre to protect The Anaesthetist, Patient and other Theatre users, explained that "safety measures entail the preoperative identification of the patient, intraoperative and post-operative actions undertaken by the anaesthetist to reduce. Or if possible, eliminate dangers emanating in anaesthetic practice".

In conclusion, there are series of actions undertaken by the anaesthetist which are aimed at preventing some of or all the anticipated complications occuring during his/her course of duty. Considerations are given to his or her different stages of service for instance, preoperatively, intraoperatively and post operatively and appreciations given to possibility of dangers/hazards occurring in anaesthetic practice.

Statement of Problem

Safety measures in anaesthetic practice have not been fully appreciated by people. The anaesthetist feels unsafe while carrying out his/her duties. The patient also thinks of his safety whenever a decision for surgery and anaesthesia is taken.

Other theatre users fear Incidents of all anaesthetic hazards like environmental pollution (by anaesthetic gases/vapours) and electrocution during services.

Research Questions

1. Are the anaesthetists aware of the safety measures in the anaesthetic practice
2. How adequately are the anaesthetic practitioners carrying out the actions so as to prevent aesthetic hazards, thereby ensuring safety?
3. Is the hospital management ready to improve on the safety measures so as to promote anaesthetic safety?
4. Are the safety measures adequate as to meet up with the aim of the actions?
5. What hinders the anaesthetic measures?
6. What are the sources through which anaesthetist learns the safety measures at each stage of the patient's care?

Objectives of Study

This study among the surgical patients, anaesthetic practitioners and other theatre users of University of Nigeria Teaching Hospital, Enugu is aimed at clarifying the following:-

1. To determine how anaesthetic hazards are prevented.

2. To determine their appreciation of the anaesthetic safety measures to ensure their individual protection preoperatively, intraoperatively and post operatively.
3. To evaluate the effectiveness of the safety measures in anaesthetic practice.
4. To determine the stage of anaesthetic management that needs improvement on the already existing safety measures.
5. To find out more ways of making anaesthesia safe in health care delivery.

Purpose of Study

In studying safety measures in anaesthetic practice the purpose of study lies ion tracing a study to acknowledge the actions undertaken by the anaesthetist thereby protecting himself, the patient and other theatre users.

Purpose of study is also to correct the impression that anaesthesia is not safe.

However, to notify the hospital management improve on the already existing safety measures in anaesthetic practice.

Significance of Study

The study will help the anaesthetist to appreciate the existence of actions that are carried out to promote safety in his/her practice.

It will help to increase the awareness that though there are numerous anaesthetic hazards, there are measures to prevent their occurrence. The study is hoped to emphasize the need for meticulous carrying out the actions that ensure safety in anaesthetic practice.

Scope and Delimitation of Study

Because of the allowed spice of time, this study has been limited to the surgical units, operating theatre, recovery room (preoperatively, intraoperatively and postoperatively) areas of the anaesthetic assignment of University of Nigeria Teaching Hospital, Enugu.

The resources available to me are also limited, hence, the study is carried out only in the University of Nigeria Teaching Hospital. This Hospital also has a large number of physician and nurse anaesthetists as compared with others.

Historical Background of University Of Nigeria Teaching Hospital Enugu

According to Mr Egere (1988), An Outline: University Of Nigeria Teaching Hospital Enugu he outlined the history as follows:

“What is today known as University of Nigeria Teaching Hospital, Enugu, began early in the century. It was planned and built by the colonial administrators as a standard general hospital for Africans”.

He continued; “It became a specialist hospital on July 1st, 1970 with a total of 50 doctors, 10 wards of 300 beds and a chest bay of 50 beds”. He went on to say that, “The then Federal Military Government took over the Hospital by decree Number 23 of 1974 although it left the management the hands of the council of the University of Nigeria Nsukka. The hospital however became independent in July 1976 with appointment of autonomous management Board… “This board made an impact in forms of reconstruction of existing structures and the provision of the new ones, refurbishing and updating equipment in existing wards and clinics”. He also included in the outline that, “The permanent site of the hospital is yet to be completed at a point 21 kilometres (Ituku/Ozalla) on the Enugu Port Harcourt express road”.

He also said that, “This hospital is a recognized centre taking into account the calibre of medical and paramedical personnel available to it”.

There are the colleges of medicine and postgraduate medicine, schools of Nursing and Midwifery, Laboratory Technology, Nurse Anaesthetists and community Health as its training schools”. He said.

Chapter Two Literature Review

Anaesthesia is defined as “a state of controllable and reversible unconsciousness with loss of sensation to pain induced by drugs used to facilitate surgery”.

In practice, anaesthesia comprises the preoperative, intraoperative and postoperative periods. It is a specialty that handles almost the delicate branch of medicine.

A R Aitkenhead (1990), Text book of Anaesthesia said that, “Planning the conduct of anaesthesia starts normally after details, concerning the surgical procedure and medical condition of the patient have been ascertained”. He went further to say that, “This practice has on itself series of risks encountered and hence the purpose of a monitoring devices is to measure the physiological variables and to indicate trends of change, this enabling appropriate therapeutic action to be taken”.

“Safety measures to obviate the anaesthetic risk/hazards encountered during practice of anaesthesia including the patient, anaesthetist, also the other theatre users should not be over emphasized, though no mechanical or electrical device can replace conscientious anaesthetists’ observations”, said, Mairlys Vater (1985), Monitoring During Anaesthesia.

In this chapter, there is going to be necessary review on literature concerning the measures undertaken by trained anaesthetists to prevent or possibly reduce the dangers that emanate from anaesthetic practice.

Safety Measures during the Preoperative Period of Anaesthetic Management

(a) Patients' Protection

Graham Smith, (1988), Preoperative Assessment and Premedication, highlighted that, "several of the large-scale epidemiological studies have indicated that inadequate preoperative preparation of the patients may be a major contributory factor to primary anaesthetic causes of perioperative mortality". He emphasized therefore, that, "it is essential that every anaesthetist visits every patient in the ward before surgery to assess fitness for anaesthesia; as this function cannot be undertaken by surgical staff".

During the preoperative assessment of surgical patients; anaesthetists should take care to discuss possible causes of anxiety and in simple terms, explain to the patients how they will be cared for, during and after anaesthesia and surgery. For knowledge of what to expect allays anxiety therefore, relaxed patients tolerate anaesthetics better.

Preoperatively, history and physical examination concentrating on physiological systems of main anaesthetic relevance and systematic evaluation of the patients are done.

G. Smith (1990), Text book of Anaesthesia, also stressed that, "The purposes of the preoperative assessment of patients are to establish rapport with the patient, obtain a history and perform a physical examination, order special investigations, assess the risks of aesthesia and surgery and if necessary postpone or cancel anaesthesia and surgery". "Nevertheless, failure by the anaesthetists to perform these may be regarded as negligent, if anaesthetic morbidity or mortality occur subsequently", he added.

According to Mr R Ugochukwu Lecture (1993), Hospital consent Forms,

“For the fact that any contact with the patient’s body by a medical personnel whether by laying hands on him for an operation, message or less directly by the use of machine directing electromagnetic or other waves at the body for example; anaesthesia, radiotherapy, chemotherapy is potentially a trespass to the patient; hence patients have to be given valid information concerning the risks/benefits of the proposed procedure”.

He further emphasized that, “If a patient is not given a sufficient information upon which he/she could reach an informed decision whether to accept the treatment proposed or not, then, he was not given a valid consent”.

“Informed consent, said Mr R Ugochukwu, “assumes greater importance because nowadays, there is emphasis on Human Rights, Freedom of the individual and increased consciousness of the rights of the individual. That, “consent should be obtained for unborn fetus, infants, adolescent (under 18 years of e), adult seal patients, geriatric patients and unconscious patients by the parents/guardians before anaesthesia and surgery and others signed by themselves”.

He went further to say that, hospital consent form protects the patients, the hospital, surgeons, anaesthetists and nurses should there be any litigation in future. It serves as adequate communication assurance given to the patient to accept or refuse any procedure, though it does not completely prevent claim or exonerate a hospital from liability or stop the patients from complaining”. “Nevertheless, he said, “hospital consent forms are important in the Hospital Law and Practice” considering the risks involved in obtaining consent for anaesthesia, surgery and other special procedures. Anaesthetist ensures that patients give consent before embarking on anaesthetic”.

“However, preoperative patient’s protection from anaesthetic hazards should embrace his/her optimum condition physically for anaesthesia and whether

the anticipated benefits of surgery are greater than the anaesthetic and surgical risks produced by concurrent diseases", said, Smith G, (1987), A Review of Anaesthetic Risks, Morbidity and Mortality. British Journal of Anaesthesia.

This review went further to emphasize that. "In principle, if there is any medical condition which may be improved (e.g. pulmonary disease, hypertension, cardiac failure, chronic bronchitis, renal disease), surgery should be postponed and appropriate therapy instituted. The decision to proceed can be made only by discussion between surgeon and anaesthetist". "This prevents all or some of the anaesthetic risks/hazards which may arise during the anaesthetic management of the patient with any of the above medical conditions".

He further illustrated that, "premedication is administered to surgical patients prior to surgery, in order to: allay his/her anxiety and fear, reduce salivary and bronchial secretions. Enhance the hypnotic effect of anaesthetic agents, reduce postoperative nausea and vomiting. Produce amnesia, reduce volume and increase their PH of gastric contents. Attenuate vagal reflexes and attenuate sympathoadrenal responses, depending on the patient's condition and extent of anaesthesia and surgery".

Dr KLA Izuora's Lecture (1995), Premedication, added that, "premedication comprises different classes of drugs given to surgical patients either the night before or at induction of anaesthesia to modify the effect of anaesthesia on the patient". He also emphasized in another lecture (1993), safety measures in the Theatre to protect the Anaesthetist, that "proper identification of the patient, eliminates the risk of performing a wrong surgery on a wrong patient thereby saving the risk of wrong anaesthetic technique". He also traced that "the patient should be protected from injury during transfer to the theatre by

guarding the patients from falling out of theatre trolley or flinging the patient's limbs".

Emphasis on preoperative patient's protection is also laid by David Fell, (1990), The Practical conduct of Anaesthesia, where he said that, "Before embarking on the anaesthetic, consideration should be given to the induction and maintenance of anaesthesia. The position of the patient on the operating table, equipment necessary for monitoring table, equipment necessary for monitoring. The use of intravenous fluids or blood for infusion. The post-operative care and recovery facilities which will be required. He should be satisfied that the correct operation is being performed on the correct patient, and that consent has been given. The patient must be on a tilting table and the anaesthetist should have a competent assistant".

According to the Matron in-charge of the Theatre at National Orthopaedic Hospital, Enugu, (1995), Safety of all patients that come to the Theatre, "proper dressing of all theatre staff before going to the operative theatre or sterile area. Proper cleaning of the theatre before, in-between and after surgeries followed by thorough scrubbing at the end of the days operations. Adequate sterilization of all necessary instruments and materials, ensure patient's freedom from contacting infection in the theatre". She further added that, "preoperatively, patients should have a bath in the morning of surgery. Have any wound dressed and have shaving (where needed), of operation area. Have all artificals on the body removed, have vital signs and urine test done".

Anaesthetists' Protection

According to Mrs On ogbule's lecture (1993), History of Anaesthesia, "It is certain that the practice of anaesthesia is a reserve for qualified doctors who specialised in Anaesthesia as their specialist field, but now, Nurses are the dominant providers.

She went further to express that, “The practice of Anaesthesia by nurses can be traced back to civil war, when nurses appeared to have provided anaesthesia to an even greater extent during the Franco – Prucian war, only a few years later”. “Both male and female nurses were taught to administer anaesthesia and they were the sole anaesthetic providers in Field Ambulatory Hospital”. She also said that, “Wars fought in foreign soil also helped to extend the use of Nurses as Anaesthetists”.

“Facing the same war problem”, she continued, “Nigeria embarked on the extensive use of Nurses as Anaesthetic providers, towing the line of the American system”. She added that, “wany states in the United States of America, where Nigeria borrowed her practice standard and curriculum, accepted the use of Nurses Anaesthetists except in Britain, just like in Nigeria where Nurse Anaesthetists are used everywhere except in Lagos University Teaching hospital and university College Hospital Ibadan”.

She included that, “The programme for the Nurse Anaesthetist in Nigeria, was born following the constraints and problems of anaesthesia at the rural community level hospitals in Nigeria, it was found that the problem was vast and undebatable”.

In another Mrs Onyegbula’s Lecture (1995), Philosophy, “Nurse Anaesthetist is basically a registered nurse who had undergone the prescribed training programme in anaesthesia”.

She emphasized that, “The nurse anaesthetist should be trained to know his/her limitations. She should call the physician anaesthetists when the need arises where there is physician anaesthetist. But where there is none, the nurse anaesthetist will definitely liaise with the surgeon, to discuss and agree on what to do. The surgeon is always in charge of the patient and not the nurse anaesthetist”.

Hucka Bay-Aradt, as quoted by Mrs Onyegbule (1993), Lecture on Philosophy, described philosophy as “Internationally chosen set of values, primary ends which serve as criteria for a choice of means to accomplish the end goal, these primary ends prescribed or prescriptive in that they select one form of action over another and they direct behaviour towards the chosen alternatives”.

She also added that, “A profession was high degree of autonomy which covers the autonomy of the individual practitioner to make decisions in the interest of modus operand’ and, that, “a profession is an expert over a definite field of knowledge and requires absolute freedom to practice his/her profession as he/she considers proper”.

Concerning this concept, she added that, since a profession has a code of Conduct/ethics, its prescribed rules and regulations guiding the conduct of the members of the profession in the exercise of their professional functions, the codes which stipulate the appropriate relationship between practitioners and clients, and between practitioners for their mutual protection”.

Safety Measures during the Intra-Operative Period / Phase of Anaesthetic Management

(a) Careful use of Anaesthetic Apparatus

Alan R. Aitkenhead (190), Anaesthetic Apparatus, said that “it cannot be stressed too highly that anaesthetists should have a sound knowledge and firm understanding of the functioning of all anaesthetic equipment in common use”. He stressed that, “although primary malfunction of equipment has not featured highly in surveys of anaesthetic-related morbidity and mortality, failure to understand the use of equipment features in these reports as a cause of morbidity and mortality”.

He furthermore emphasized that, “it is essential that the anaesthetist checks that all equipment are functioning correctly before he proceeds to

anaesthetising patients". "Adverse events occur during anaesthesia with great rapidity, and faced with an imminent disaster The anaesthetist must be assured in avance that any equipment which he proposes to use is functioning correctly".

While emphasizing the need to get equipment for anaesthesia functioning and ready before the actual conduct of anaesthesia, David Fel1, (1951), The Practical conduct of Anaesthesid, added that, "Before eabarking on the anaesthetics, consideration should be given to the induction and maintenance of anaesthesia. The position of the patient on the operating table. Equipment Necessary for monitoring. The use of intravenous fluids or blood form frsion, and the postoperative care and recovery facilities which will be required". He also said, that, "The availability and function of all anaesthetic equipment should be checked before starting"-

(b) Choice of anaesthetic agents

According to Walter S Nimmo (1990), Principles of general Pharmacology and Pharmacokinetics, "Pharmacokinetics (what the body does to a drug) comprises the study and characterization of the time course of drug absorption, distribution, metabolism, and excretion. In addition to the relationship of these processes to the time course of desirable and toxic effects of drugs, while Pharmacodynamics comprises the study (what the drug does to the body) of the pharmacological effects of a drug determined by its action on specific receptors and the concentration of the drug at the receptor site".

He further expressed that, "Thus in the selection of a drug for use, pharmacokinetics is of importance. Only if two or more drugs are available with very similar effects and toxicity. The study of drug absorption, distribution, metabolism and excretion has great contribution to make anaesthesia safe".

Furthermore on the choice of aesthetic agent, Granam Smith (1990), Inhalational anaesthetic agents, contributed that, “Volatile and gaseous anaesthetic agents remain popular for induction and maintenance of anaesthesia. But, ideally should have pleasant odour. It should be non-irritant to the respiratory-tract and allow pleasant and rapid induction of anaesthesia”. “It should be chemically stable in storage, and should not interact with the material of anaesthetic circuits ur with soda lime and either flammable nor explosive. It should be capable of producing unconsciousness with analgesia and preferably some degree of muscle relaxation”. It should be sufficiently potent to allow the use of high inspired oxygen concentrations when necessary. Not be metabolised in the body, be non-toxi and not provoke allergic reactions”. And that ‘It should produce minimal depression of the cardiovascular and respiratory systems. It should be completely inert and eliminated completely and rapidly in unchanged form through the lungs”. “Though non meets all this”.

Morealso, Alan R. Aitkenhead, (1950), intravenous Anaesthetic agents, expressed that, “only a few drugs are suitable for use routinely to produce anaesthesia after intravenous injection”.

He also stressed that, “Ideal intravenous anaesthetic agent should have rapid onset of action. Early recovery of consciousness. Analgesia at sub-anaesthetic concentrations and minimal cardiovascular and respiratory depression”

That, “it should have no emetic effects. No excitatory phenomena (e.g. coughing, hiccup, involuntary movement) on induction. No emergence phenomena (nightmares). No interaction with neuromuscular blocking drugs. No pain at injection. Not toxic effect on other organs. No release of histamine. No hypersensitivity reactions and should be water-soluble formulation. Be safe

if injected inadvertently into any artery". This also he said that "None of the agents available at present meets all these requirements".

(c) Induction of Anaesthesia and its Maintenance

David Fell (1991) The Practical Conduct of Anaesthesia, stressed the need for, "The proposed procedure should be explained to the patient before starting".

And that, "Inhalational induction is indicated most commonly in young children, upper airway obstruction (e.g. Epiglottitis) lower airway obstruction with foreign body. Brochopleural fistula or empyemar and no accessible veins". Also that, "Intravenous induction is suitable for most routine purposes and most appropriate method of rapid induction for the patient undergoing emergency surgery, in whom there is a risk of regurgitation of gastric contents".

He further said that, "All drugs which may be required at induction should be prepared and appropriate size cannula is inserted into the forearm or back of the hand vein for transfusion of fluids or blood and drugs, after skin preparation with alcohol has been done. Ensuring intravenous entry and securing it with tape". "Preoxygenation is one, by administration of 100% oxygen by face mask".

And that, "Doses of induction agents vary with the patient's weight, age, state of nutrition, circulatory status, premeditation and any concurrent medication". Also that, "After induction of anaesthesia, the patient is placed on the operating table in a position appropriate for the proposed surgery. When positioning the patient the anaesthetist should take into account surgical access, patient safety, anaesthetic technique, monitoring and position of intravenous lines. Some commonly used positions are lithotomy, lateral, prone, trendelenburg and sitting. Each may have adverse effects in terms of skeletal, neurological, and circulatory affects".

“After induction”, he said, anaesthesia may be continued using inhalational agents, intravenous anaesthetic agents or intravenous opioids either alone or in combination. Tracheal intubation with or without muscle relaxants may be employed and regional analgesia may also be used to supplement any of these techniques”.

Mairlys Vater (1985), monitoring During Anaesthesia, said that, “Adequate monitoring appears to be one of the more critical factors in preventing injury to patients during anaesthesia. In that analysis of anaesthetic mishaps often identifies events which might have been prevented by the use of an appropriate monitor”. “Established standards for minimal monitoring during the conduct of any anaesthetic are analysed us continuous presence of the anaesthetist. Blood pressure monitoring and frequent monitoring of heart rate. Continuous electrocardiogram display. Ventilation – observation of reservoir bag. Circulation – palpation of the pulse. Breathing system disconnection monitoring (when intermittent positive pressure ventilation is used. Inspired oxygen concentration and temperature monitoring”.

He added that, “No mechanical or electrical device can replace conscientious observations of the patient by the anaesthetist”. And that, “ceticulous anaesthetic record – keeping for all patients undergoing anaesthesia in highly important. It should contain details of preoperative assessment including drug history, cardiovascular variables, (including heart rate, arterial pressure and urine output). Respiratory variables.

Details of apparatus used. Dosages of all drugs and concentration of gaseous and volatile agents. Intravenous infusions, volume of blood lost, any problems or difficulties encountered and postoperative instructions”.

He emphasized that, “Detailed, accurate charts provide not only a valuable record of trends occurring during anaesthesia, but, are also for reference

purposes, If further administration of anaesthesia is necessary. May also be required for medicolegal purposes, should litigation arise later".

Safety Measures during the Postoperative Phase/Period of Anaesthetic Management

David Fell (1991), The Practical conduct of Anaesthesia, said that, "At the end of surgery, residual neuromuscular blockade (where used) 16 antagonised and spontaneous ventilation established before the tracheal tube (where applied) is removed and the patient awakened". That, "After tracheal extubation or at the end of mask anaesthesia, anaesthetic agents are withdrawn and oxygen 100% is delivered via the face mask. The patients' airway is supported until respiratory reflexes are intact, when patient's general condition stabilizes, he/she is the ready for transfer from the operating table to the recovery room/area for further recovery".

In the recovery room/area, Mrs animba (1993), Lecture on Principles/modalities for immediate Postoperative management, stressed that, "Post-operative/ Post anaesthetic complications are the disturbances in the normal physiological functions of the body emanating following a surgery or anaesthesia within the first 12 – 24 hours. The anaesthetist should be alert while monitoring a patient postoperatively in the recovery room. ile should be able to anticipate and prepare for the necessary equipment for any post-operative/anaesthetic complication. He should also to be able to identify (diagnose) immediately and accurately any postoperative complication. Should carry out immediate and accurate intervention and meticulously record everything for medicolegal documentation".

Safety Measures to Protect Anaesthetists Patients and Other Theatre Users

With reference to Alan R. Aitkenhead (1990), The Operating Theatre Environment, “measures are taken to promote safety in the operating theatre to prevent the possible occurrence of electrocution, gas explosions, risk of pollution of the atmosphere with anaesthetic gases and vapours. Contracting infections particularly human immunodeficiency virus (H.I.V) or hepatitis B from infected patients”. And that “Environmental controls of varying degrees of complexity, to reduce the risk of airborne infections. Services for anaesthetic equipment. Artificial lighting appropriate for surgeon and anaesthetist. Separate areas for reception and recovery of patients”. He added that, “The main purpose of operating theatre environment is to minimize the risk of transmission of infection to the patient from the air, building or the staff”.

According to Graham Smith (1990), Basic physics for the Anaesthetist, “The anaesthetist is in daily contact with a large amount of equipment which is powered by mains supply electricity. This includes monitoring equipment, some ventilators, suction apparatus, defibrillators, and diathermy equipment” He suggested that, “A common way of reducing the risk of a large current injuring the anaesthetist in the operating theatre is to wear antistatic shoes and to stand on the antistatic flour”.

Alan R. Aitkenhead (1990), The Operating Theatre Environment, added that, “Diathermy must not be used if explosive anaesthetics (e.g. diethyl ether, cyclopropane) are employed”.

He further said, that, “There has been considerable controversy regarding the risk to theatre staff from atmospheric pollution by aesthetic gases and Vapours. suggestion that theatre staff are more likely than other hospital personnel to suffer from hepatic and renal disease, to have non-specific

neurological symptoms, and for their children to have an increased risk of congenital abnormality. Also female staff suffered from high incidence of spontaneous abortion and impairment of professional performance". These, he said, "however, none of these problems has been substantiated", "Nevertheless", he added, "it is sensible to minimize atmospheric pollution in the operating theatre which require the installation of anaesthetic gas scavenging systems in all areas in which anaesthesia is administered. Volatile skin cleansing fluids and aerosol sprays should be used sensibly and inhalation of vapours should be avoided".

On infection transmission among the theatre staff, he said that, "The most serious types of acquired infection in operating theatre staff are human immunodeficiency virus and hepatitis B, which may be contracted by contact with blood or body fluids from an infected patient. Many health care workers have been infected in this way, either by needle -stick injury, or through cuts and abrasions; hence disposable equipment should be used where possible and non-disposable equipment should be decontaminated adequately".

However, he added that, "skilled and dedicated help should be available to the anaesthetist at all times". He finally emphasized that, "The most effective means or reducing the risk of an anaesthetic accident is to ensure that every aspect of anaesthetic management is conducted competently. The anaesthetist considering risk of patients awareness intraoperatively, legible and comprehensive anaesthetic record. Communication with the patient or relatives and standards Lords of anaesthetic practice may be improved by identifying areas in which patient care has been suboptimal".

Chapter Three Research Design and Methodology

Research Method

This chapter deals with the area of study, population of study, sample technique, instrument of data collection and method of data analysis.

Area of Study

This study was conducted at University of Nigeria Teaching Hospital, Enugu.

Population of Study

The studied population were six physician anaesthetists, Fourteen nurse – anaesthetists, four surgeons, four anaesthetic technicians, ten perioperative nurses, and two student nurse anaesthetists.

Sample Technique

A stratified random sampling technique was used. The respondents were classified into their respective strata and samples were taken in a ratio of 1:4 as shown in the table below.

DESIGNATION	TOTAL POPULATION	NUMBER OF SAMPLE	PERCENTAGE %
Physician Anaesthetists	6	3	15%
NNurse Anaesthetists	14	7	35%
Surgeons	4	2	10%
Technicians	4	2	10%
Perioperative Nurses	10	5	25%
Student Nurse Anaesthetist	2	1	5%
TOTAL	40	20	100%

Instrument of Data Collection

The required data was collected by the use of questionnaire consisting of one open-ended question and six close – ended questions.

The close – ended questions enabled the respondents to choose from available options, while the open – ended question gave them the opportunity to express their own opinion about the subject matter.

Twenty questionnaires were shared out and all were retrieved, representing a return rate of 100%, as shown in table below:-

DESIGNATION	NO OF QUESTIONNNAIRES DISTRIBUTED	NO OF QUESTIONNNAIRES RETRIEVED
Physician Anaesthestists	3	3
Nurse Anaesthetists	7	7
Surgeons	2	2
Technicians	2	2
Perioperative Nurses	5	5
Student Anaesthetist	1	1
TOTAL	20	20

Method of Data Analysis

Responses to all the questions were tallied organised, using tables and percentages from which conclusions were drawn.

Chapter Four Data Presentation and Analysis

Introduction

Response to the questions were sorted out and put into frequency distribution table which was converted into percentage. The percentage was done by dividing the number of respondents of each group with the total number of all the respondents multiplied by one hundred over one.

Twenty questionnaires were distributed and all were retrieved. Representing a return rate of 100%. Out of the twenty respondent 15% were physician anaesthetists, 25% were nurse anaesthetists, 10% were surgeons, 10% were technicians, 25% were perioperative nurses; 5% were student nurse anaesthetists.

This is shown in the table below.

Presentation of Data

Table III: Designation of Respondents

Designation	Respondents	Percentage
Physician anaesthetists	3	15%
Nurse anaesthetists	7	35%
Surgeons	2	10%
technicians	2	10%
perioperative nurses	5	25%
student nurse anaesthetists	1	5%
Total	20	100%

The table shown below, represents the working experience of the respondents.

Out of the total population studied, 25% had 0-5 years of experience, 25% had 6-10 years, 10 had 11-15 years experience, 25% had 16 – 20 years, 10 had 21 – 25 years, and 5% had 26 – 50 years working experience.

Table IV: work experience.

	Respondents	Percentage
0-2 years	5	25%
6-10 years	5	25%
11-15 years	2	10%
16-20 yours	5	25%
21-25 years	2	10%
20-30 years	1	5%
	20	100%

Question Item 1. Whether the respondents agree that there are dangers/risks/hazards associated with Anaesthetic practice.

Table V

Response	Respondents	Percentage
Yes	20	100%
NO	0	0%

TOTAL	20	100%

The table above shows that, the response to question one is 100%, in favour that there are associated dangers/risks/hazards with anaesthetic practice. Hence, there should be need for adequate safety measures to be taken.

Question: Whether the respondents have witnessed any anaesthetic danger/risks/hazards.

Table VI

Response	Respondents	Percentage
Yes	17	85%
NO	3	15%
TOTAL	20	100%

The above table shows that, 85% of the Respondents had witnessed anaesthetic dangers/risks/hazards, while 15%, of the Respondents had not witnessed any. Therefore, anaesthetic dangers/risks/hazards have a high percentage of occurrences in practice. Hence, more safety measures are necessary.

Question 3: Whether the respondents know which group of people that are more exposed to anaesthetic hazards.

Table VII

Response	Respondents	Percentage
The patients	1	5%
The Anaesthetists	2	10%

Other theatre users	3	15%
All of the above	14	70%
None of the above	Nil	Nil
TOTAL	20	100%

From the above table, it indicated that the response to question 3 shows that 5% of the respondents know that the patients are affected, 10% know that the anaesthetists are exposed, 15% know that other theatre users are exposed and that 70% agree that the patients, the anaesthetists, other theatre users are exposed to anaesthetic hazards. Therefore, all are exposed, but in varying degrees.

Question 4: Whether the respondents know which phase of Anaesthetic management hazards occur.

Table VIII

Response	Respondents	Percentage
Preoperatively	1	5%
Intraoperatively	12	60%
Postoperatively	7	35%
TOTAL	20	100%

Table VIII above, snows that, 5% of the respondents said that anaesthetic hazards occur preoperatively, 60% said intraoperatively, and 35% postoperatively. This shows that anaesthetic hazards occur most during intraoperative phase of Anaesthetic management.

Question 5; Whether it is possible to minimize or avoid anaesthetic hazards.

Table IX

Response	Respondents	Percentage
Yes	20	10%
NO	0	0%
TOTAL	20	100%

The response to the above question in the above table is 100%. Indicating that it is possible to minimize or avoid anaesthetic hazards.

Question 6: Whether the respondents know the possible causes of anaesthetic hazards.

This was an open-ended question in order to allow the respondents snow their opinions. From data collected it shows that the possible causes of anaesthetic hazards are geared to the anaesthetists' factors, anaesthetic causes, and anaesthetic equipment factors. While some of the respondents said that patients'' pathological conditions are inclusive. Occasionally, it could be idiopathic factors.

Question 7: Precautionary measures to adopt to ensure safety in anaesthetic practice.

Table X

Response	Respondents	Percentage
Awareness of Anaesthetic hazards occurring	0	0%
Adequate Preoperative Patients Assessment	0	0%

Proper use of Anaesthetic Surgical Equipment and Agents	0	0%
Proper Patients' Management	0	0%
All of the above	20	100%
Total	20	100%

The above table shows that all the respondents said all the listed factors should be adopted to ensure Safety in anaesthetic practice.

Chapter Five Discussion of Research Findings

This chapter deals with the discussion of research finding, summary of other chapters, conclusion, recommendations, bibliography and questionnaires.

Discussion of Research Findings

Opinions were sorted from twenty respondents, comprising three physician anaesthetists, seven nurse-anaesthetists, two surgeons, two technicians, five perioperative nurses and one student-nurse anaesthetist.

All information gathered were analysed, put into frequency distribution table and were converted to percentages. This was used in evaluating the safety measures in anaesthetic practice in University of Nigeria Teaching Hospital, Enugu.

Out of the total population studied, it was found out that the respondents had varying working experiences between zero to thirty years.

It was clear from the responses that all the respondents agreed that there are dangers/risks/hazards associated with anaesthetic practice. 85% had actually witnessed some hazards, while 15% had not. Therefore, anaesthetic dangers/risks/hazards have high percentage of occurrence.

Out of the total population studied, 5 said that patients are affected. 10% said the anaesthetists, 15% said that other theatre users and 70% said that all of the above are exposed in varying degrees to anaesthetic hazards/risks/dangers during practice.

Further analysis showed that 5% of the respondents knew that anaesthetic hazards/risks/dangers occur preoperatively, 60% said intraoperatively while 35% said postoperatively. This indicated that dangers/risks/hazards occur during every phase of anaesthetic management but mostly during the intraoperative phase/period.

All the respondents agreed that it was possible to minimize or completely avoid anaesthetic risks/dangers/hazards.

Furthermore, the analysis of data collected showed that the possible causes of anaesthetic risks/dangers/hazards were generated from the anaesthetist's factors, anaesthetics' causes and anaesthetic equipment factors. While some of the respondents said that, patients' pathological conditions were inclusive and that occasionally, it could be idiopathic factors.

Finally, all the respondents said that the precautionary measures to adopt in order to ensure safety in anaesthetic practice were the awareness of anaesthetic hazards occurring, adequate preoperative patients' assessment. Others were proper use of anaesthetic/surgical equipment and agents and proper patients' management.

Summary

The study of the safety measures in anaesthetic practice in University of Nigeria Teaching Hospital, Enugu, was carried out to acknowledge the actions undertaken by the anaesthetists in order to protect themselves, the patients and other theatre users against the dangers/risks/hazards of anaesthesia.

Also, to correct the negative impression that anaesthesia is not safe.

Appropriate literatures were reviewed. Safety measures during preoperative, intraoperative postoperative phases/periods and the safety measures to protect the anaesthetists, patients and other theatre users were considered in details.

The study was particularised to the physician anaesthetists, nurse – anaesthetists, student nurse anaesthetists, surgeons, perioperative nurses, and technicians of University of Nigeria Teaching Hospital, Enugu.

The population of study was twenty persons as listed in the above groups of people who were selected by random sampling in the ratio of 1:2. The method used in collecting the data was questionnaire and the return rate was 100%

The collected data were analysed using tables and percentages.

Conclusion

Actually, there are risks/dangers/hazards in association with the practice of anaesthesia, which have high rate of occurrence. These dangers can occur during all the phases/periods of anaesthetic management.

The anaesthetists, the patients and other theatre users are exposed to these hazards which can emanate from the anaesthetists, anaesthetics and anaesthetic equipment/agents factors.

Finally, it is possible to avoid or at least, reduce these dangers by adoption of precautionary measures to ensure safety in anaesthesia.

Recommendations

Considering the research findings, some recommendations are important. This is to ensure safety for the anaesthetists, the patients and other theatre users during the anaesthetic practice comprising before, during and after surgery.

The hospital management should organize symposium, workshops, clinical meetings on regular bases to update the knowledge of the already practicing anaesthetists so as to ensure safety in anaesthetic practice.

Also, should improve on the standard of training for student anaesthetists.

Furthermore, the hospital management should carry out installation of adequate anaesthetic equipment/agents, regular check-up in servicing of anaesthetic equipment.

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Questionnaire

School of Anaesthesiology,
Department of Anaesthesia
University of Nigeria Teaching
Hospital, Enugu
January, 1995.

QUESTIONNAIRE

I am a student of the above mentioned institution carrying out a research study on the safety measures in Anaesthetic Practice in University of Nigeria Teaching Hospital, Enugu.

Your valuable and honest contribution will be appreciated. All information obtained will be treated confidentially.

Thanks for your co-operation.

CHIEGBOKA, Chinenye Mary Rose.

INSTRUCTION

Tick the appropriate answer/Fill in the sap.

a. Rank/Designation
b. Number of years in service
c. Area of work of Respondent ...

QUESTIONS:

1. Do you agree that there are dangers/risks/hazards associated with anaesthetic practice? Yes……No……
2. Have you witnessed any? Yes……No……
3. What group of people are exposed to anaesthetic hazards? The patients ……The anaesthetists…… other theatre users……. All of the above…… None of the above……
4. During which phase of anaesthetic management do hazards occur? Preoperatively…… Intraoperatively…..Postoperatively……
5. Is it possible to minimize or avoid anaesthetic hazards? Yes…… NO…….
6. What are the possible causes of anaesthetic hazards? (1) ----------.. (2) .....……(3)..... (4)…….
7. What precautionary measures would you adopt to ensure safety in anaesthetic practice?

   Awareness of anaesthetic hazards occurring. ……..
   Adequate preoperative patient's assessment……..
   Proper use of anaesthetic surgical Equipment and agents. ……..
   Proper patient's management……..
   All of the above……..