

REPUBLIQUE DU CAMEROUN

Paix – Travail – Patrie

MINISTERE DE L'ENSEIGNEMENT
SUPERIEUR

UNIVERSITE DE YAOUNDE I

FACULTE DE MEDECINE ET DES
SCIENCES BIOMEDICALES

DEPARTEMENT DE SANTE PUBLIQUE



REPUBLIC OF CAMEROON

Peace – Work – Fatherland

MINISTRY OF HIGHER EDUCATION

THE UNIVERSITY OF YAOUNDE I

FACULTY OF MEDICINE AND
BIOMEDICAL SCIENCES

DEPARTMENT OF PUBLIC HEALTH

Evaluation of quality of care at the orthopedic surgery Unit at Central Hospital in Yaounde

Thesis written in fulfilment for the requirement of a Doctorate degree in General Medicine by:

MBONO AKOUMA Constantin Wilfried Arthur

Mat N°:18M002

Supervisor

Pr ESSI Marie-José
Professor
Medical Anthropology

Co-supervisor

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Associate Professor
Orthopedic Surgery



Academic year 2021-2022

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Defense date : 30th July 2022

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PRELIMINARIES

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DEDICATION

To my dear and lovely parents

Mr MBONO Francois Xavier

And

Mrs MBONO EDOA Marie Josephine.

THANKSGIVING

At the end of this research work, our most sincere thanks are addressed:

The Lord God Almighty for all his blessings and the grace he never ceases to fill me with day and night.

To the Dean of the Faculty of Medicine and Biomedical Sciences ZE MINKANDE Jacqueline, for the devotion she shows in her capacity as head of the teaching and administrative staff.

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To my father MBONO Francois Xavier, thank you for the values you instilled me, for your support and for the love you have for me. May the Lord continue to fill you with His grace.

To my mother MBONO EDOA Marie Josephine. My role model, the one who made me who I am. The very example of the working woman who does not give up in front of anything and who fights for her family. Thank you for always being there and for responding to all my requests despite the difficulties. May the Lord continue to bless you.

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To the health workers of the services in which this study was conducted, thank you for your welcome.

To all those who have contributed directly or indirectly to the realization of this work and who are not mentioned here, thank you very much.

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DEPARTMENT OF PHARMACOTOXICOLOGY AND PHARMACOKINETICS			
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240	MPONDO MPONDO Emmanuel	P	P Pharmacy
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242	TABI OMGBA	SL	Pharmacy
243	NENE AHIDJO épouse NJITUNG TEM	L	Neuro-pharmacology
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248	NYANGONO NDONGO Martin	L	Pharmacy

KEY

- **HOD**= Head of Department
- **P**= Professor
- **AP**= Associate Professor
- **SL**= Senior Lecturer
- **L**= Lecturer

HIPPOCRATIC OATH

Declaration of Geneva adopted by the 2nd General Assembly of the World Medical Association, Geneva, 1948 et revised in Octobre 2017 :

« As a member of the medical profession, I solemnly pledge to dedicate my life to the service of humanity;

The health and well-being of my patient will be my first consideration;

I will respect the autonomy and dignity of my patient;

I will maintain the utmost respect for human life;

I will not permit considerations of age, disease or disability, creed, ethnic origin, gender, nationality, political affiliation, race, sexual orientation, social standing, or any other to intervene between my duty and my patient;

I will respect the secrets that are confided in me, even after the patient has died;

I will practice my profession with conscience and dignity and in accordance with good medical practice;

I will foster the honour and noble traditions of the medical profession;

I will give to my teachers, colleagues, and students the respect and gratitude that is their due;

I will share my medical knowledge for the benefit of the patient and the advancement of healthcare;

I will attend to my own health, well-being, and abilities in order to provide care of the highest standard;

I will not use my medical knowledge to violate human rights and civil liberties, even under threat;

I make these promises solemnly, freely and upon my honour.

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LIST OF ABBREVIATIONS

WHO: World Health Organisation

IOM: Institute Of Medicine

CHY: Central Hospital of Yaounde

OR: Operating Room

ATLS: Advance Trauma Life Support

ISS: Injury Severity Score

CT scan: Computed Tomography scan

RTA: Road Traffic Accident

GA: General Anesthesia

MRI: Magnetic Resonance Imaging

OREF: Open Reduction External Fixation

ORIF: Open Reduction Internal Fixation

FBC: Full Blood Count

ABSTRACT

Context: Increasing incidence of trauma injuries in orthopedics and the rarity of care quality evaluation in Cameroon due to the bias opinion of their main aim in health providers mind makes it important to evaluate the quality of care delivered so as to help the health professional make the best diagnostic and therapeutic choice for the patient thus increasing their chances of survival.

Objectives: Evaluate care quality in the Orthopedic Unit at Central Hospital, describe the pathologic profile, evaluate the resources, assess the procedures.

Methodology: To attain this objective, an observational evaluative situational analysis design study was conducted in the Orthopedic Surgery Unit at Central Hospital of Yaounde in the from November 2021- June 2022. The pathologic profile was assessed by file review and data collected using a questionnaire, human resources data were collected using an interview guide, also material resources were assessed using an observation grid, furthermore processes were analysed using an evaluation grid. Data collected was analysed using the statistical package for social sciences SSPS version 26. The mean and median were used for quantitative variables and the Likert scale was used to establish a qualitative value to each patient in terms of continuity, safety, and efficacy. These values were then used in turn to obtain the care quality value of each medical file included and thus the overall care quality.

Results: Following data collection, 200 medical records and 40 medical staff members were included in the study. For the former The median age was 39 years, with an interquartile range of 30 to 53 years and extremes ranged from 6 to 87 years. A sex ratio of 1:1.63. Secondly the most common cause of traumatic injury was RTA with 79%. In addition to this fractures were the commonest type of trauma with closed fracture constituting 54.41% and open fracture 41.5% of cases of which 95% happened through a direct mechanism. Furthermore the lower limb was the predominant body part affected for 70.76% followed by 14.41% for the superior limb. For the latter, during the first week of data collection in the Orthopedic Surgery Unit we had 3 surgeons, 14 residents, 7 registered nurses, 13 assistant nurses, 3 medical student for a total of 40 medical staff members to which the 13 admission rooms (containing 50 beds) were divided accordingly. The median age of the experienced number of years of the medical staff was 2.5 years with the extremities being 3 months and 16 years. The sex ratio was 1:1. Also concerning the material resources the study objectivated that 71.4% of the technical equipment was functional and in good state, adequate at 97.2% but accessible at 37.5%. Moreover most of the procedures in power were regularly implemented but only two were found to be lagging behind as they were oftenly enacted.

The last but not the least the care quality was adequate in 98% of cases with efficacy being at its best in 93.5% of cases, continuity being at its best in 98% of cases and safety was at its best in 71% of cases.

Conclusion: The care quality at the Orthopedic Surgery Unit at Central Hospital of Yaounde meet up the recommended standard in term of continuity and efficacy but more effort has to be done in the improvement of safety which is lower due to the less adequate health environment and the passivity in the application of certain procedures.

Key words: Evaluation, Quality of care, Orthopedic Surgery Unit.

RESUME

Contexte: La survenue des traumatismes dans les services d'orthopédie est de plus en plus fréquente au Cameroun. L'opinion biaisée des prestataires de soins sur la qualité des soins en orthopédie rend difficile l'appréciation de cette dernière chez les patients. Une évaluation de la qualité des soins administrés en orthopédie semble donc importante afin d'aider les professionnels de la santé à faire le meilleur choix diagnostique et thérapeutique pour le patient, et augmenter ainsi les chances de survie de ces patients.

Objectifs: Évaluer la qualité des soins dans le service de chirurgie orthopédique de l'hôpital central de Yaoundé.

Methodologie: Pour atteindre cet objectif, une analyse situationnelle a été menée dans le service de chirurgie orthopédique de l'hôpital central de Yaoundé de de Novembre 2021- Juin 2022. Le profil pathologique a été évalué à l'aide d'un questionnaire et par l'examen des dossiers des patients. Les données sur les ressources humaines ont été recueillies à l'aide d'un guide d'entretien ; les ressources matérielles ont été évaluées à l'aide d'une grille d'observation et les processus ont été analysés à l'aide d'une grille d'évaluation. Les données recueillies ont été intégrées et analysées grâce au logiciel SPSS (statistical package for social sciences) version 26. La moyenne et la médiane ont été utilisées pour les variables quantitatives et l'échelle de Likert a été utilisée pour établir une valeur pour chaque patient en termes de continuité, de sécurité et d'efficacité. Ces valeurs ont été utilisées à leur tour pour obtenir la valeur de la qualité des soins de chaque dossier médical inclu dans l'étude et par la suite la qualité globale des soins.

Resultats: À la suite de la collecte des données, 200 dossiers médicaux et 42 membres du personnel médical ont été inclus dans l'étude. L'âge médian était de 39 ans, avec un intervalle interquartile de 30 à 53 ans et des extrêmes allant de 6 à 87 ans. Un rapport de masculinité de 1:1,63. La cause la plus fréquente de plaie traumatique était l'ATR avec 79% ; les fractures étaient le type de traumatisme le plus rencontré : les fractures fermées constituaient 54,41% des cas et les fractures ouvertes 41,5% des cas dont 95% produits par un mécanisme direct. Le membre inférieur était la partie la plus affectée avec un taux de 70,76% contre 14,41% pour le membre supérieur. Au cours de la première semaine de collecte de données dans l'unité de chirurgie orthopédique, nous avons eu 3 chirurgiens, 14 résidents, 7 infirmières enregistrées, 13 infirmières auxiliaires, 3 étudiants en médecine pour un total de 40 membres du personnel médical auxquels les 13 salles d'admission (contenant 50 lits) ont été divisées en conséquence. L'âge médian du nombre d'années d'expérience du personnel médical était de 2,5 ans, les extrémités étant de 3 mois et 16 ans. Le sex ratio était de 1:1. En ce qui concerne les ressources matérielles, l'étude a objectivé que 71,4% des

équipements techniques étaient fonctionnels et en bon état, adéquats à 97,2% mais accessibles à 37,5%. En outre, la plupart des procédures en vigueur ont été régulièrement mises en œuvre, mais seules deux d'entre elles ont été jugées à la traîne car elles étaient souvent peu adoptées. Enfin, la qualité des soins était adéquate dans 98% des cas ; l'efficacité était à son meilleur dans 93,5% des cas, la continuité était à son meilleur dans 98% des cas et la sécurité était à son meilleur dans seulement 71% des cas.

Conclusion: La qualité des soins dans le service de chirurgie orthopédique de l'hôpital central de Yaoundé répond à la norme recommandée en termes de continuité et d'efficacité, mais il reste encore beaucoup d'efforts à faire pour améliorer la sécurité, ce qui est inférieur en raison de l'environnement de santé moins adéquat et de la passivité dans l'application de certaines procédures.

Mots clés: Evaluation, Qualité des soins, Service de chirurgie orthopédique

INTRODUCTION

Orthopedic injuries are characterised as a damage to the element of the musculoskeletal system (ligaments, bones, soft tissues, muscles and joints). They can be divided into non-traumatic and traumatic injuries. The latter often result from a sudden accident like a fall that requires immediate medical attention. While these injuries are not all life-threatening, they are life altering and lead to diverse complications which are distinguished by their period of onset. The diagnosis is made from a bundle of medical history, physical and radiologic information that helps in the proper triage of patients and administration of the appropriate treatment.

Traumatic injury is an important and a significantly increasing problem to health care systems world wide [1]. According to the World Health Organisation (WHO), traumatic injuries are one of the leading causes of mortality in the world, with 90% of the injuries estimated to occur in developing countries where preventive efforts are often nonexistent, and health-care systems are less prepared to meet the challenge [2,3]. In Africa it accounts for 9% of the burden of disease [4]. A survey covering a period of eight-year reported that 25% of Americans had impairments secondary to musculoskeletal conditions [5]. Another national survey carried out in Rwanda has shown a prevalence of 5.2% for musculoskeletal damage [6]. Also a study carried out in Botswana objectivated a prevalence of 73.5% of non-traumatic orthopedic injuries [7]. Furthermore in Cameroon the prevalence of trauma on the musculoskeletal system is 96.6% [6].

Most practitioners consider medical evaluation as a control of the tutorship to identify a dysfunction in the establishment and is mainly associated to a notion of sanction which is just a bias. Meanwhile evaluation of quality of care which is a scientific and systematic procedure which helps to determine in what measure an act or several actions led to the successful achievement of one or more predetermined objectives [8].

According to World Health Organisation (WHO) quality of care is defined as a way to ensure the delivery of a combination of diagnostic and therapeutic act to every patient so as to assure a better health result in accordance with the actual state of health science, at a better price for the same result and a lesser iatrogenic risk for his greatest satisfaction in terms of procedures, results and human contact inside the health system [9].

But the most widely used definition comes from the institute of medicine which states that: quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge [9-11]. The latter was assessed using different quality criteria. In Europe the process of medical evaluation has been instored and is under the control of national agencies while in

Africa and Cameroon the evaluation of hospital units is rare [12]. Thus assessing quality of care will help in the provision of an optimum health care to patients, improve the unit and hospital actual standard of medicine.

Chapter I : PROBLEM

I.1. JUSTIFICATION

The rarity of the notion of evaluation of quality of care in Cameroon due to the bias opinion of their main aim in the practitioner mind makes it important to evaluate the quality of care given to offer them a better care and increasing chance of survival.

I.2. RESEARCH QUESTION

Does quality of care at the Orthopedic Surgery Unit at Central Hospital of Yaounde meet up the recommended standards ?

I.3. HYPOTHESIS

Due to its level in the health pyramid, the Orthopedic Unit of Central Hospital of Yaounde meet up the recommended standard of quality of care of in terms of interaction with the same health care professional in a series of discrete episodes, in the use of available resources to provide optimum health care in accordance with the actual medical knowledge that result in improved health outcomes for each patient.

I.4. OBJECTIVES

- **General objective**

Evaluate care quality in the Orthopedic Unit at Central Hospital of Yaounde

- **Specific objectives**

1. Describe the pathologic profile.
2. Evaluate the resources.
3. Assess the procedures.

I.5. CONCEPTUAL FRAMEWORK

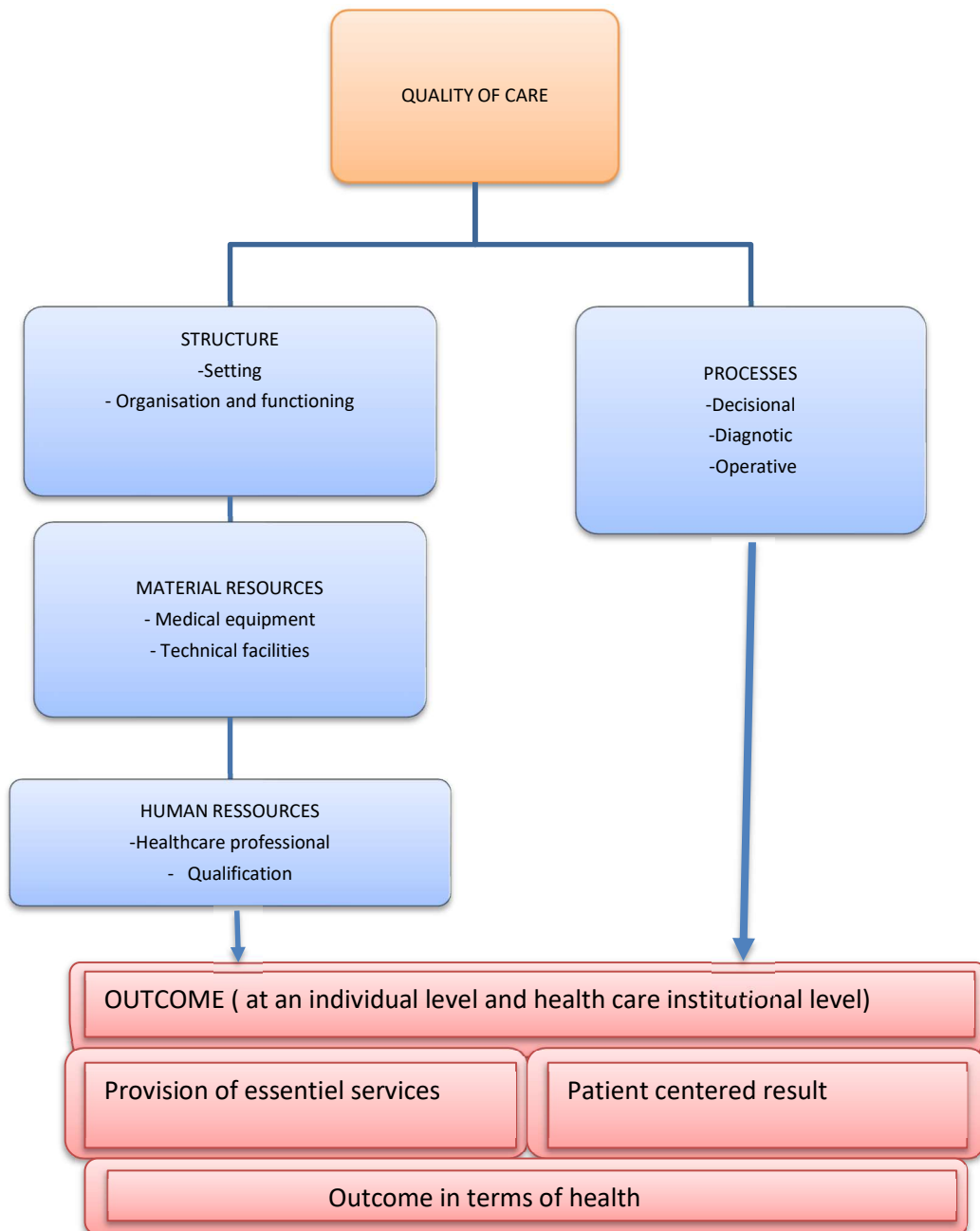


Figure 1: Conceptual framework scheme.

OPERATIONAL CONCEPTS

- Quality assurance: It is the implementation of an appropriate set of pre-established, systematic provision designed to give confidence in obtaining the required quality [12].
- Activities: It is an aggregation of actions aimed at strengthening public health capacities and services in order to provide conditions under which health and wellbeing can be maintained by people [13].
- Establishment: The whole or part of a public or private institution, building, place, facility whether for profit or not that is operated or designed to provide in and out patient diagnosis, therapeutic intervention and or other health service [14].
- Human resources: The different kinds of clinical staff responsible for public and individual health intervention [15].
- Material resources: Material resources, the goods and services that income leverages, have been proposed as important factors in determining population health [16].
- Processes: The sum of the different steps, transitions, and interfaces that must be followed to provide health care [17,18].
- Structure: It is the setting in which provision of health care occurs [8,17].
- Outcome: The results of the provided health care [18,19].
- Resources: It is a combination of asset that can be drawn on by an institution or a person in order to maintain or ameliorates the population health either for diagnosis or therapeutically [19,20].
- Technical facilities: All medical setup, devices and equipments contributing to the diagnosis and treatment of patients [21,22].
- Unit: It is an area in a health care facility which provides specialized care to targeted patients [23,24].
- Orthopedic: It is a branch of medicine that focuses on the care of the musculoskeletal system [25].
- Polytrauma: A critically ill trauma patient with two or more anatomically distinct injuries among which atleast one of the injury is lifethreatening [26,27].
- Polyfracture: Patient with at least two fractures involving different anatomical segments [28].
- Injury: Damage to the body caused by an external force [29].
- Trauma: It is any severe injury to any element of the musculoskeletal system that is caused by an external source [30].

I.6. RESEARCH INTEREST

The study will provide hospital head with evidence to improve the standard of the orthopedic surgery unit were needed and increase the quality of care provided to patients which also increases the survival chances of orthopedic trauma.

I.7. THEORITICAL FRAME

The study is in relation with Surgery, Orthopedic specialty and in Public Health, management. The following the following chapter is titled literature review it is divided in three different parts :the first section on orthopedic trauma, the second section on the case management of orthopedic trauma and a third section on the evaluation of quality of care in a surgical orthopedic Unit.

Chapter II : LITERATURE REVIEW

In this chapter a brief recall on the musculoskeletal system ,orthopedic trauma, its diagnosis and treatment is going to be done and subsequently generalities on quality of care evaluation.

II.1. THE MUSCULOSKELETAL SYSTEM

It can be defined as a network of hard and soft tissues that provides and performs different functions in the human body. These functions include: support, stability and movement to the body [31]. It is made up of the skeleton, skeletal muscles, tendons, ligaments, joints and articular cartilage [32,33].

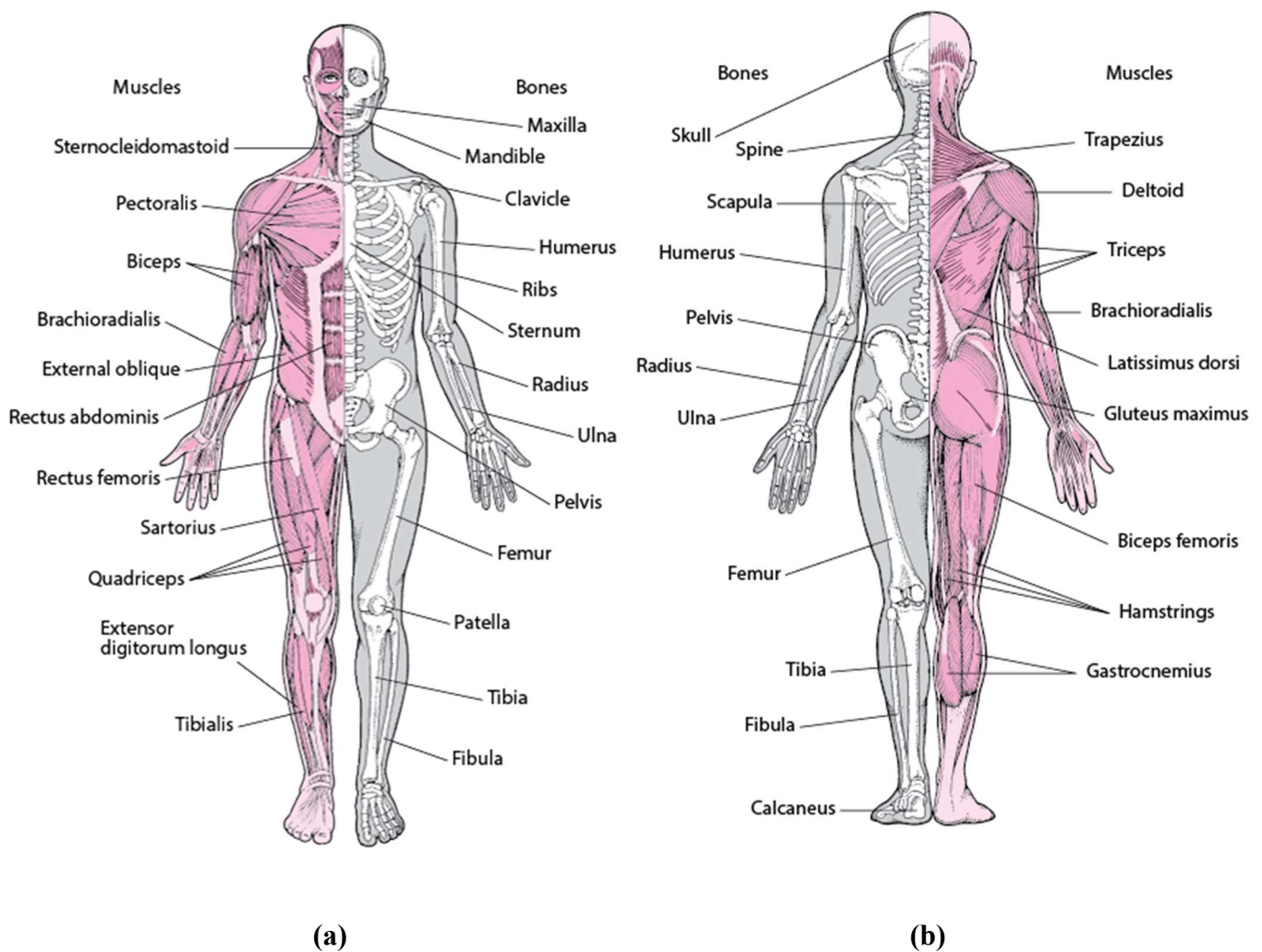


Figure 2: (a) Anterior view of the musculoskeletal system ; (b) posterior view of the musculoskeletal system [34].

II.1.1. The skeleton

The adult human skeleton is composed of 206 bones and their associated cartilages. The bones are supported by ligaments, tendons, bursae, and muscles. The bones of the body are grouped within the two distinct divisions [34]. That is:

- Axial skeleton, that includes the bones along the long axis of the body. The axial skeleton consists of the vertebral column, bones of the head and bones of the thoracic cage [34,35].
- Appendicular skeleton, that involves the bones of the shoulder and pelvic girdle, as well as the bones of the upper and lower extremities [34,35].

❖ **Bones**

Bones are rigid structures made of calcified dense connective tissue. Bone tissue is composed of a mineralized bone matrix that consists of type 1 collagen fibers dispersed throughout the ground substance. The cellular component of the bones is represented by three types of specialized bone cells called osteocytes, osteoblasts and osteoclasts [34-36]. The bones consist of two distinct layers that differ in histological appearance and characteristics;

- Compact (cortical) bone is the outer much denser layer of the bone which gives it its smooth, white, and solid appearance. The outer surface of the compact bone is covered by a layer of dense connective tissue known as periosteum. On its inner surface, the compact bone is covered with endosteum, which separate the compact from spongy bones [34,35].
- Spongy (cancellous) bone is the deep airy layer of the bone. Unlike the compact bone, spongy bone is highly vascularized and more metabolically active. It is typically found within the ends of long bones and in the vertebrae. In certain bones, like the hip bone and femur the central part of spongy bone houses the bone marrow [34,35].

Bones can be classified according to their shapes as follows:

- Long bones have a tubular shape, with a longer longitudinal and a shorter transverse diameter. They are composed mostly of compact bone, while the spongy bone and bony marrow fill the ends of the bones. Examples of long bones include, the humerus, tibia and clavicle. A typical long bone consists of a long shaft (diaphysis) that extends into a neck (metaphysis) and head (epiphysis) on its proximal and distal ends [34-38].
- Short bones have a roughly cuboid in shape, and only contain a thin layer of compact bone surrounding the spongy bone. Examples include, the tarsal and carpal bones.
- Flat bones are mostly thin, flattened and usually curved. They contain two parallel layers of compact bones surrounding a layer of spongy bone. Examples include, most of the skull bones, scapula, sternum and sacrum [34-38].
- Sesamoid bones are small, rounded unique types of bones that are embedded in muscle tendons where the tendon passes over a joint. The largest sesamoid bone in the body is the patella, but other smaller sesamoid bones are found in the hand and foot [34-38].

- Irregular bones they are peculiar and irregularly shaped and are unique in their appearance and functions. Examples; vertebrae, hip bone and some bones of the skull [34-38].

❖ **Cartilage**

Cartilage is a flexible connective tissue found in multiple organ systems of the body. Cartilage is composed of specialized cells called chondrocytes, collagen fibers and abundant ground substance rich in proteoglycan and elastin fibers [34,35]. Cartilage is classified into the following types based on its composition:

- Hyaline cartilage, is composed of type II collagen and an abundance of ground substance, which gives it a glossy appearance. It is the most abundant type of cartilage found in joints (articular cartilage), as well as the nose, larynx, trachea and ribs [34,35].
- Elastic cartilage is similar to hyaline cartilage but contains more elastic fibers. It is found in structures such as the pinna of the ear, auditory tube and epiglottis [34,35].
- Fibrocartilage is composed of plenty of collagen fibers type I and a smaller amount of ground substance. Examples include intervertebral discs and pubic symphysis [34,35].

The musculoskeletal system specifically contains articular cartilage, a type of cartilage that lines the articulating surfaces of bones. The articular cartilage provides congruence to the articulating bones and allows them to bear weight and glide over each other with very little friction [35,36].

❖ **Joints**

Each bone of the musculoskeletal system is connected to one or more bones via a joint. Joints provide a fulcrum to the bones, on which they pivot and thereby allowing movements of body parts. However, some joints do not move, such as joints between the bones of the skull [34,35,38]. The structures that cross the joint, such as tendons and ligaments contribute to its stability.

Based on the type of tissue that holds the neighboring bones together and the range of motion they exhibit, joints can be classified into the following:

- Synovial joints are movable joints in which the bones are not in direct contact, but are separated by a potential space called the synovial cavity. The synovial cavity is lined by a synovial membrane that secretes the synovial fluid which nourishes and lubricates the articulating surfaces in order to reduce friction [35,40]. The articulating bones in most synovial joints are lined with hyaline cartilage. These joints usually have a wide range of motion, examples include the knee, shoulder, sternoclavicular and elbow joints [35,40].

- Fibrous joints are the articulations in which bones are connected by dense fibrous connective tissue. The bones in fibrous joints are firmly held together allowing negligible movement. They are found between the cranial sutures, the distal tibiofibular [31,35].
- Cartilaginous joints are articulations in which the bones are connected by cartilage. The bones have a range of motion between synovial and fibrous joints. Example costochondral joints, pubic symphysis [34-39].

❖ **Ligaments**

Ligaments are fibrous bands made of dense regular connective tissue which are similar in structure to tendons. Unlike the tendons that connect muscles to bone, the ligaments connect bone to bone. In the musculoskeletal system, ligaments stabilize the articulating bones and reinforce the joints [35,36]. Depending on their anatomic position relative to the joint capsule, ligaments are classified into:

- Capsular ligaments are essentially thickenings of the joint capsule that form either elongated bands or triangular structures. These ligaments serve to reinforce the integrity of the joint capsule. An example of the capsular ligament is the iliofemoral ligament of the hip joint [35].
- Intracapsular ligaments are the ligaments that lie internal to the joint capsule. These ligaments reinforce the connection of the articulating surfaces of the joint, but allow a far wider range of motion than other ligaments. Examples include anterior and posterior cruciate ligament of the knee joint [35].
- Extracapsular ligaments are ligaments that lie outside the joint capsule. These ligaments provide the most stability to the articulating bones, and are important for preventing dislocations. They can lie in close proximity (e.g. medial collateral ligament of the ankle joint) or a bit further from the joint capsule (vertebral ligaments) [35].

❖ **Bursae**

Bursae are small sac-like outpouchings of the joint cavity lined by synovial membrane. They are found around the joints, providing cushioning of the associated bones, tendons and muscles and reducing friction between adjacent structures [31,35]. They are mostly located near the large joints of the arms and legs. For example, suprapatellar bursa found at the knee. The suprapatellar bursa allows for these structures to slide over each other without friction during flexion and extension of the knee joint [35].

II.1.2. The muscular system

It is an organ system composed of specialized contractile tissue called the muscle tissue. There are three types of muscle tissue, based on which all the muscles are classified into three groups:

- Cardiac muscle, which forms the muscular layer of the heart (myocardium).
- Smooth muscle, which comprises the walls of blood vessels and hollow organs.
- Skeletal muscle, which attaches to the bones and provides voluntary movement [35].

Based on their histological appearance, they are classified into striated and non-striated muscles; with the skeletal and cardiac muscles being grouped as striated, while the smooth muscle is non-striated. The skeletal muscles can be controlled voluntarily, as they are innervated by the somatic part of the nervous system. In contrast to the cardiac and smooth muscles [35].

❖ Skeletal muscles

The skeletal muscles are the main functional units of the muscular system. There are more than 600 muscles in the human body. They vary greatly in shape in size, with the smallest one being the stapedius muscle in the inner ear, and the largest one being the quadriceps femoris muscle in the thigh [38]. They are organized into four groups for every region of the body: muscles of the head and neck, muscles of the trunk, muscles of the upper limbs and muscles of the lower limbs [38].

Structurally, the skeletal muscles are composed of the skeletal muscle cells which are called the myocytes (muscle fibres, or myofibrils). Muscle fibers are specialized cells whose main feature is the ability to contract [35,40]. They are elongated, cylindrical, multinucleated cells bounded by a cell membrane called sarcolemma [40,41]. The cytoplasm of skeletal muscle fibers (sarcoplasm), contains contractile proteins called actin and myosin. These proteins are arranged into patterns, forming the units of contractile micro-apparatus called sarcomeres [38,40].

Each muscle fiber is enclosed with a loose connective tissue sheath called endomysium. Multiple muscle fibers are grouped into muscle bundles, which are encompassed by their own connective tissue sheath called the perimysium [40,41]. Ultimately, a group of muscle bundles comprises a whole muscle belly which is externally enclosed by another connective tissue layer called the epimysium. This layer is continuous with yet another layer of connective tissue called the deep fascia of skeletal muscle, that separates the muscles from other tissues and organs [35,41].

❖ Tendon

Is a tough, flexible band of dense connective tissue that serves to attach skeletal muscles to bones [40]. Tendons are found at the distal and proximal ends of muscles, binding them to the periosteum of bones at their proximal (origin) and distal attachment (insertion) on the bone [35,40]. As muscles contract, the tendons transmit the mechanical force to the bones, pulling them and causing movement [35].

As a result of its location and function, the musculoskeletal system commonly sustains traumatic injuries and degenerative changes. The impairments that develop from injury or disease can significantly affect an individual's ability to remain functional without further pathologic compromise [32].

II.2. TRAUMATIC ORTHOPEDIC LESIONS

Orthopedic trauma is characterised as a severe injury to the element of the musculoskeletal system (ligaments, bones, soft tissues, muscles and joints) and are often caused by an external agent which may be either life threatening or not. While these injuries are not all life-threatening, they are life altering due to their diverse complications.

All components of the musculoskeletal system can be damaged but it is vital to consider not only what structures has been damaged, but also how the damage has come about, known as the mechanism of injury [31]. This mechanism of injury usually differ from one structure to another or may involve more than one component of the musculoskeletal system.

The injury may either be direct by a blunt or penetrating external insult such as a cut by a knife, or indirectly, such as a nerve damaged by the sharp end of a bone. The amount of energy imparted to the any connective tissue is proportional to the degree of violence applied [31].

II.2.1. Soft tissue injuries

The term soft tissues refers to those parts which are not bone or cartilage. That is the skin, muscles, tendons, ligaments, blood vessels and nerves. Injuries here can be classified broadly as ; contusion, sprain , strain, rupture.

Skin injuries can be distinguished into firstly superficial wound, mostly due to penetrating trauma and include; incised wounds, which are relatively uncontaminated and heals with little scarring [31]. Also, lacerations they may be clean and are similar to incised wounds but may often be associated with surrounding tissue damage. Furthermore, abrasions which are caused by trauma to the superficial skin layers, usually by friction [31].

Secondly deep wound, commonly due to blunt trauma and include; contusion, this is the same as a bruise and consists of tissue damaged by a blow or crush, it is usually swollen and infiltrated

with blood [31]. Moreover foreign bodies, they frequently do cause a local reaction or abscess and may be the cause of a continually draining sinus. And the last firearm wounds less common, the degree of damage is directly proportional to the velocity [31].

Joint injuries, damages to joint often result in combined injuries. These latter are often associated with severe soft-tissue compromise, fracture and in more severe cases neurological structures and even blood vessels lesions [42-44].

Ligament injury (sprain), occur through direct or indirect mechanism. The direct mechanism causes an injury secondary to trauma without a preexisting disease, while the indirect mechanism, leads to a pathological degeneration process prior to the injury [45]. Ligament injuries vary from mild injuries involving the tearing of only a few fibres to complete tears of the ligament, which may lead to instability of the joint. They are graded from first-degree to third-degree [46].

Muscle injury (strain) they are frequently caused by sudden movement, by direct trauma and overstretching due to indirect trauma in sporting activities. They can be divided into acute strain due to high energy or sudden violence and chronic strain due to injury that existed for a long time leading to muscle ischaemia and fibrosis [34].

Tendon injuries may occur as a result of direct or indirect trauma. Direct trauma includes contusions and lacerations, such as lacerations of the flexor tendons of the hand. Indirect tendon injuries are usually a consequence of tensile overload [47]. when the injury is recognized suture may be possible at the time the wound is closed.

Vascular injuries, may affect the arteries and veins triggering bleeding and ischemia [48]. Commonly injured are the femoral artery and the arteries of the lower leg. Any injured limb should be examined for evidence of ischaemia, expansionary swelling should arouse suspicion and failure to secure return of circulation should be an indication for exploration and if necessary repair of vessels [31,48].

Nerve injuries usually occur via direct trauma due to lacerations, gunshot wounds, penetrating injuries, burns. Indirect trauma may stretch or tear a nerve [31].



(a)

(b)

Figure 3: (a) Deep wound of the heel with regular borders, haemorrhagic background and a ruptured Achilles tendon ; (b) bruises extending from the anterior surface of the hand to the wrist.

II.2.2. Bone injury

A fracture is a breach in the structural continuity of the bone cortex, with a degree of injury to the surrounding soft tissues [26,49]. A comminuted fracture is one with more than two fragments. Gross comminution is usually caused by severe violence and in such cases union is often delayed or difficult to achieve [31]. Different type of fractures occurs depending on the magnitude and direction of the force causing them. They include ;

- Transverse fracture: This is usually caused by a force applied directly to the site at which the fracture occurs [31,34].
- Spiral or oblique fracture: This is produced by a twisting force applied distant from the site of the fracture, usually at each end of a long bone such as the tibia [31].
- Greenstick fracture: it is a partial thickness fracture where only cortex and periosteum are interrupted on one side of the bone, while they remain uninterrupted on the other side. This occurs in children, whose bones are soft and yielding [50].
- Crush fracture: This occurs in cancellous bone as a result of a compression force [31].
- Burst fracture: This usually occurs in a short bone, such as a vertebra from strong direct pressure; in the vertebrae this usually occurs as a result of impaction of the disc [51].

-Avulsion fracture. This is caused by traction, a bony fragment usually being torn off by a tendon or ligament [52].

-Fracture dislocation or subluxation: This is a fracture which involves a joint and results in malalignment of the joint surfaces [31].

-Open fracture: here the surface of the fracture communicate with the environment [53].

The traditional view of injuries as accidents, or random events, has resulted in the historical neglect of this area of public health. However, the most recent estimates show that injuries are among the leading causes of death and disability in the world. About 5.8 million people die each year as a result of this injuries which accounts for 10% of the world's death. Injury is the leading cause of death in low and middle-income countries [4]. They affect all populations, regardless of age, sex, income, or geographic region [54]. In Africa it accounts for 9% of the burden of disease [4]. Another national survey carried out in Rwanda has shown a prevalence of 5.2% for musculoskeletal damage [6]. Furthermore in Cameroon the prevalence of trauma on the musculoskeletal system is 96.6% [6].

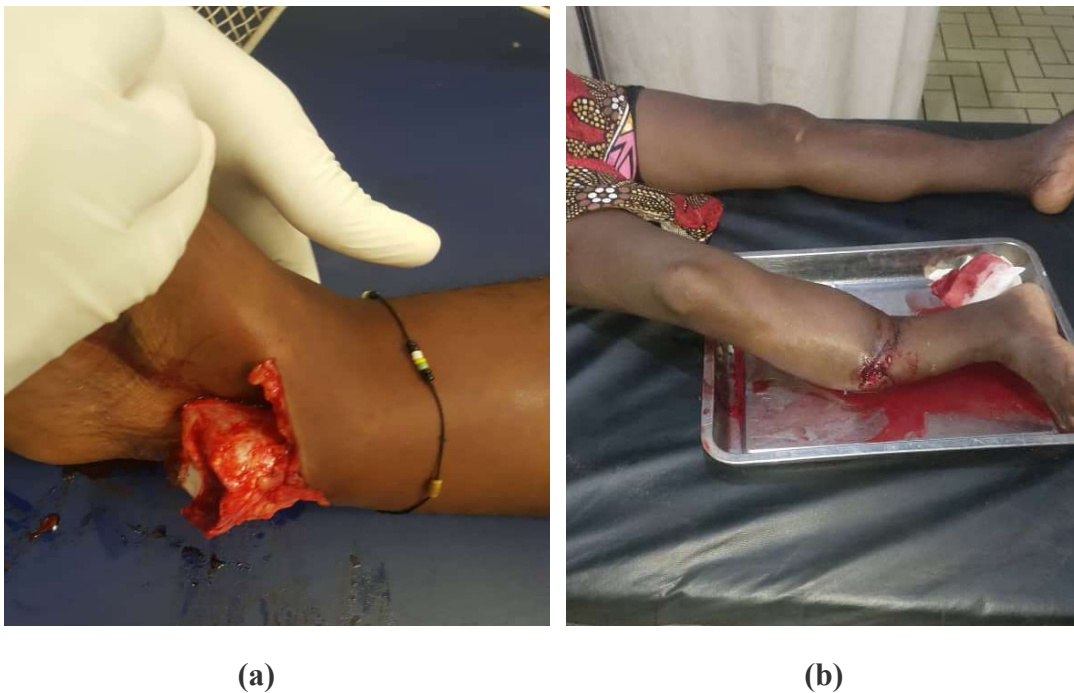


Figure 4: (a) Open fracture of the forearm ; (b) Open fracture of the right leg

Severe trauma is still one of the leading causes of death worldwide. The initial treatment and diagnostics are of immense importance in polytraumatized patients. The initial approach mainly focuses on the advanced trauma life support (ATLS) concept. This includes the identification of life-threatening conditions and application of life-saving interventions.

II.3. TRAUMATIC ORTHOPEDIC LESIONS DIAGNOSIS AND SURGICAL MANAGEMENT

II.3.1. Diagnosis

It is well established in the literature that anamnesis and physical examination are directly related to the diagnosis but also complementary examination provide additional information to that obtained by clinical judgement. X-ray images are one of the most common types of medical images, they are mosly used in bone fracture detection due to their low cost, high speed, wide availability and ease of use. Even though the level of details provided by x-ray images is low compared to other types of medical images such as CT and MRI, it is enough for bone fracture detection [55].

X - rays done in at least two planes, usually at right angles, are essential. A fracture may be missed if only one film is taken. Some fractures may elude both clinical and radiological diagnosis, and treatment may have to rest on suspicion initially, with X-ray changes occurring later as bone healing occurs [31].



Figure 5: (a) AP view of an X-ray showing a solution of continuity at the diaphyseal part both the tibial and fibular bones of the left leg ; (b) AP view of an X-ray showing a solution of continuity at the diaphyseal part of the humeral bone.

Ultrasound is a cross-sectional imaging method based on sound waves reflected off tissue surfaces. It provides more detail information of soft tissues (bursae, ligament, muscle, tendon and nerve) pathologies than CT and MRI but does not penetrate the bone hence deeper structure to bones such as: intra articular ligaments are not visualised [26,56].

CT scanning has become a useful aid in diagnosing the more difficult injuries, particularly fractures of the pelvis, spine and complex intra-articular fractures due to the fact that it produces more osseous details but is less effective in soft tissue visualisation. It can be useful for planning the details of surgery [56].

MRI excels at detecting changes in bone marrow, displaying soft tissue detail, demonstrating areas of inflammation and its use in association to intravenous contrast helps to highlight certain structure [56].

Imaging is very important because it helps in management of trauma by assisting in screening and prioritizing a trauma or polytrauma patient's care.

II.3.2. Management

The management of major trauma differs from one center to another. The key to successful management is to have an effective, early system for resuscitating and assessing the patient, coupled with a service allowing rapid and efficient transfer to a large trauma centre offering wide expertise.

Advanced Trauma Life Support (ATLS) has spread worldwide. In this system, the patient is managed by a team, with each member carrying out his own task and with an experienced team leader providing overall supervision. The steps are as follow: Primary survey and resuscitation, secondary survey, review, documentation and initial treatment plan [8].

Primary survey and resuscitation: The primary survey is a sequence of steps from A to E, and the team member is only able to move from one step to the next when the preceding one had been completed. They include:

Airway with cervical spine control. The adequacy of the airway is checked whilst respecting the potential for there being a cervical spine injury by maintaining cervical spine immobilization [57,58]. Breathing, the patient needs to be adequately ventilating via the patent airway. Circulation, there must be a satisfactory volume within the circulation and an adequate cardiac output with control of blood loss [57,58]. Disability, A brief assessment of neurological disability. Exposure, the whole patient must be exposed so that any occult injury can be dealt with [57].

Resuscitation occurs whilst the survey is being carried out, so that at the end of the primary survey the patient should have a stable airway, circulation and be adequately oxygenated. In the multiply injured patient, prioritization of the injuries and coordination of the care with the anesthetic team is required [57].

In the secondary survey procedures are being carried out the team leader is responsible, helped by information from the other team members, to conduct a complete and systematic examination of the patient from head to toe [58].

The implementation of such elaborate case management in orthopedic trauma is an unavoidable parameter for care quality improvement. But before improvement of the latter the actual level of care quality must be measured. Assessment of care quality is done using measurement tools that makes it possible to collect evidence of what is practiced to be able to judge their effectiveness.

II.4. EVALUATION OF CARE QUALITY

Evaluation is the act of giving a value to make a judgment or a ranking, it is an imperative of quality [59]. World Health Organisation (WHO) define care quality as a way to ensure the delivery of a combination of diagnostic and therapeutic act to every patient so as to assure a better health result in accordance with the actual state of health science, at a better price, for the same result and a lesser iatrogenic risk for his greatest satisfaction in termes of procedures, results and human contact inside the health system [59].

But the most widely used definition comes from the institute of medicine which states that: quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge [9-11].

The evaluation of care quality is a scientific and systematic procedure which helps to determine in what mesure an act or several actions lead to the succesful achievement of one or more predetermined objectives [59]. The main measurement tools are indicators and surveys.

II.4.1. Indicator

An indicator is a measurement tool that is used as guides to monitor, evaluate, and improve the quality of patient care, clinical support services, and organizational function that affect patient outcomes [60,61]. The analysis of an indicator is always linked to the context in which it is produced. Different fields of application of health assessment have been updated which are: evaluation of structures, evaluation of strategies and evaluation of results.

II.4.2. Methods of evaluation

❖ Evaluation of structures

The terme structure here design the different means put into place for the overall management of the patient that is; health professional and their qualification, technical medical platforms and the medical equipment [59-61].

❖ Evaluation of procedures

The evaluation of strategies takes into account the activities of doctors and healthcare professionals directly or indirectly devoted to the diagnosis or treatment of patients[59-61]. This may include punctuality, clinical examination, strategies for prescribing additional examinations and treatments, follow-up of patients. Therefore, it is necessary that a strict observance of the diagnostic approach and the unity of a complementary examination are respected [59-61]. More difficult to set up is this monitoring of the use of orthopedic and traumatological materials, compliance with indications and contraindications of the different techniques carried out because the standards of practice vary over time and from one region to another [60,61].

❖ Evaluation of results

The results are the changes induced in the patient in terms of health status, quality of life, satisfaction. It is interesting to develop result indicators that really testify to the quality achieved. One example is satisfaction rates. They are the most questionable. However, they are essential because the perceived quality will condition the behavior of patients in its relationship with the service provider. But this type of indicator remains difficult to develop because it takes into account many variables [60,61].

Evaluation of the impact of corrective measures on medical practice. In addition to the clinical audit, there are other outcome indicators such as the determination of morbidity, mortality and patient satisfaction [60].

II.4.3. Evaluation tools

APPROACH	CONCERNING ACTIVITIES	ACTIVITIES AND PATHOLOGY
Evaluation of professional practice	Indicators of results or Processes	Clinical audit File review
Quality assurance	Structure audit	Processes analyses
Overall quality	Result indicators Patient satisfaction	Patient satisfaction

Table I: Care quality evaluation tools

Different tools were used for evaluation they include :

- A survey is an oral or written action to collect, within the framework of a set objective, opinions or information from a population. The survey questionnaire is developed and ordered according to the criterion of the reference framework [60]. The questionnaires are explicit and adapted to the audience to be interviewed.
- Evaluation Grid is a tool to assist organizations in planning and systematically evaluating programs [59].
- Observation grid the observation grid is a spreadsheet or log of sorts that enables the observer to actually record observable events [62,63].

In conclusion the aim is to describe the different areas, it is well expected that these areas must be studied and contributes to the internal evaluation of care institutions, the search for overall quality and the best service provided to the patient.

II.5. STATE OF KNOWLEDGE

In this part a synthesis of the actual knowledge on care quality assessment in orthopedic services is to be discussed. For it to be done a documentary research in PubMed and Google scholar database was carried out, also scientific reviews and articles were scrutinized.

World wide

Beaulé PE and al. in 2016 in a study named “Amélioration continue de la qualité en chirurgie orthopédique: modifications et répercussions de la réforme du financement système de santé” revealed that CQI programs for health care services can inform decision-making and, through knowledge translation, optimize care and improve its effectiveness. Potential outcomes include greater patient satisfaction, improved patient-reported outcomes, more effective intervention plans, and overall savings [64].

In 2012 in Iran Adib Hajbaghery M and al carried an observational study on “Quality of care for patients with traction in shahid beheshti hospital in 2012.” showed that The overall mean score of quality of care was 10.20 ± 2.64 . Quality of establishing traction was good in 55% of patients, but the quality of care was poor in the domains of recording care (88%) and patient education (96%). Total mean of quality of care was significantly different between male and female patients ($P < 0.02$) [65].

In Europe

In 2018 a descriptive study done by Eubank BH. and al on “Evaluating quality of care for patients with rotator cuff disorders” objectivated that healthcare accessibility was hindered by longer than expected waiting times. Acceptability (i.e., patient satisfaction) varied depending on physician type and waiting times. 22% experienced indirect clinical pathways, whereby care was fragmented and patients received care from multiple and often, redundant healthcare professionals showing inefficiency in healthcare resource utilization. The current quality of care for patients presenting with chronic, full-thickness rotator cuff tears is inappropriate, as only 54 out of the 171 patients requiring surgery were able to consult with a surgeon within benchmark timeframes. No adverse reactions were reported by patients, hence “safe”, the majority of patients failed to receive treatment from appropriate healthcare providers within the right timeframe [66].

In Africa

A prospective study done in Mali on “Evaluation de la qualité de la prise en charge des patients victimes d’accident de la circulation routière dans le service de chirurgie orthopédie et traumatologique au CHU Gabriel Touré” demonstrated that Mali lacks a national framework

for measuring the quality of care, which reduces its ability to improve it. The condition of the hospital wards did not meet international standards. There was a lack of equipment. The service suffers from a lack of staff and these staff do not benefit from continuous training. The final result was considered good in 99.1% of cases and the development considered favourable in 99.1% of cases. The overall patient satisfaction rate at discharge was 98.13% [12].

A prospective study carried in 2009 on “La démarche qualité en chirurgie orthopédique et traumatologique du CHU Gabriel Touré” found that the premises have a fair level of cleanliness (50% of the opinions of the providers and 96% of the opinions of the hospitalized patients). The categorization of hospital wards were not in conformity with the country’s regulation, also 10% of the health care in the service was done by a non qualified personnel, as for patient satisfaction 7.8% of patients said they were not satisfied with the services due to lack of explanations on the evolution of the disease, the postponement of interventions for lack of equipment, the delay of the providers in consultation, long duration of the treatment. In terms of the motivation of health providers 76.7% of the latter were not motivated in their daily practice because of the: the low level of the technical platform, the lack of continuous training of the staff, the lack of control of the activities by the managers of the service, the financial incentive. Verbal abuse of caregivers [60].

A prospective study carried out in 2021 named “Evaluation de la qualité des soins au service de chirurgie pédiatrique du CHU Gabriel Toure” found that the technical facilities were functional a 65.69% and that the material was adequate at 92.31% , that human resources were 100% qualified. Furthermore concerning the processes there was an insufficiency in waste triage and that material maintenance was not ensured. Moreover the study found a care quality of 70.93% which was inferior to 80% as preconized by WHO [67].

Chapter III: METHODOLOGY

The following chapter describe the methodological approach taken to attain the previously stated objectives.

III.1. TYPE OF STUDY

Situational Analysis study is an assessment of the current health situation and is fundamental to designing and updating national policies, strategies and plans.

III.2. SITE

Yaounde Central Hospital (CHY). Created in the 30s, it is an intermediate level hospital in the health pyramid of Cameroon. It is situated in the Centre region, Mfoundi division and Yaounde II sub-division. Being one of the largest hospital in term of technical facilities, variety of specialties, personnel number and it's geographical location it suscitates a high level of frequentation by the population. It houses several unit including the Orthopedic Surgery Unit. The latter consist of ; 8 Offices: 1 for the chief of service, 2 for the orthopedic surgeons, 2 for the head nurses which also serve as secretaryship, 1 for the residents, 1 for the nurses and nursing aid, and the last for orthopedic staff. Also the unit has 13 hospitalisation rooms: 11 sharing room and 2 private rooms.

The medical personnel is made up of a permanent unit head (one of the three surgeon), 3 orthopedic surgeons, 14 residents in orthopedic surgery, 20 nurses and 3 medical student.

III.3. STUDY PERIOD

The study took place for a period of 8 months from November 2021 to June 2022.

III.4. STUDY POPULATION

- **Target population:** The Orthopedic Surgery Unit
- **Source population:** Orthopedic surgery Unit at CHY, medical records of hospitalized and operated patients for traumatic orthopedic lesions in the unit.
- **Inclusion criteria of medical records**
 - Completely filed medical record.
 - Patient diagnosed with traumatic orthopedic lesions.
- **Exclusion criteria of medical records**
 - Patient diagnosed with non-traumatic orthopedic lesions.
 - Incompletely filed medical record.

III.5. SAMPLING

Sample size of the Orthopedic Surgery Unit was exhaustive

The study sample for the number of medical file to be reviewed was non exhaustive and calculated using Lorentz formular

$$n = \frac{Z^2 P(1-P)}{e^2}$$

Where n is the sample size, Z is the statistic correspondence of level of confidence, p is expected prevalence and e is the range of confidence interval.

Suppose Z= 1.96, P= 0.96 then e will be 0.05

Then $n=(1.96)^2 \times 0.96(1-0.96)/(0.05)^2$

n= 58,4

which was rounded up to give a sample size of 59.

III.6. DATA COLLECTION TOOL

Evaluation grid: It is a tool that is commonly used as a means of evaluating certain actions and determining if the actions meet the standards set for them.

Observation grid: It is a spreadsheet or log of sorts that enables the observer to actually record observable events.

Interview guide: It is a set of structured questions that been prepared to serve as a guide to interviewers, researchers in collecting data on specific topic.

Questionnaire : It is a research instrument that consist of a set of questions for the purpose of gathering information from the respondents through survey or statistical analysis. It is a mixed of closed ended and open ended questions.

III.7. PROCEDURE

- **Ethical and administrative considerations**

Validation of research protocols by thesis directors. Obtention of ethical clearance from the institutional ethical and research committee of the faculty of medicine and biomedical sciences. Beside research authorization from the director general of CHY.

- **Data collection**

The pathologic profile is our first specific objective but because resources are fixed they are going to be evaluated first, followed by the procedures then the pathologic profile using archived medical report from the years 2019-2021 and consecutively during the study period.

- **Before data collection**

Validation of research protocols by thesis directors. Ethical clearance was obtained from the institutional ethical and research committee of the faculty of medicine and biomedical sciences. Also research authorization was obtained from the director general of CHY.

- **During data collection**

Information collected from medical report fulfilling inclusion criteria were filled in our pathologic profile questionnaire consisting of the following parts: sociodemographic data,

pathologic profile characteristic, treatment, and evolution. Also material resources were evaluated using an observation grid in which the availability, adequacy and the state of the material were assessed. Furthermore the application of the procedure over time was evaluated using an evaluation gride and the last but not the least an interview guide was used to obtain data from resources.

- After data collection

The results obtain were statistically analysed and results interpreted, discussed and presented to a jury.

III.8. DATA ANALYSIS

Pathologic profile was appreciated and significance of the data established using Chi squared. Resources and procedures were restituted in the form of verbatims, tables and diagrams. The list of variables was:

1. Unit: avtivities, establishment
2. Pathologic profile: type, treatment, outcome
3. Resources: technical facilities, material, human expertise
4. Procedures: diagnosis, operative, decisional

Chapitre IV : RESULTS

IV.1. RECRUITMENT

The recruitment was done solely in the Orthopedic Surgery Unit and the following steps of recruitment was done as demonstrated in the diagram below.

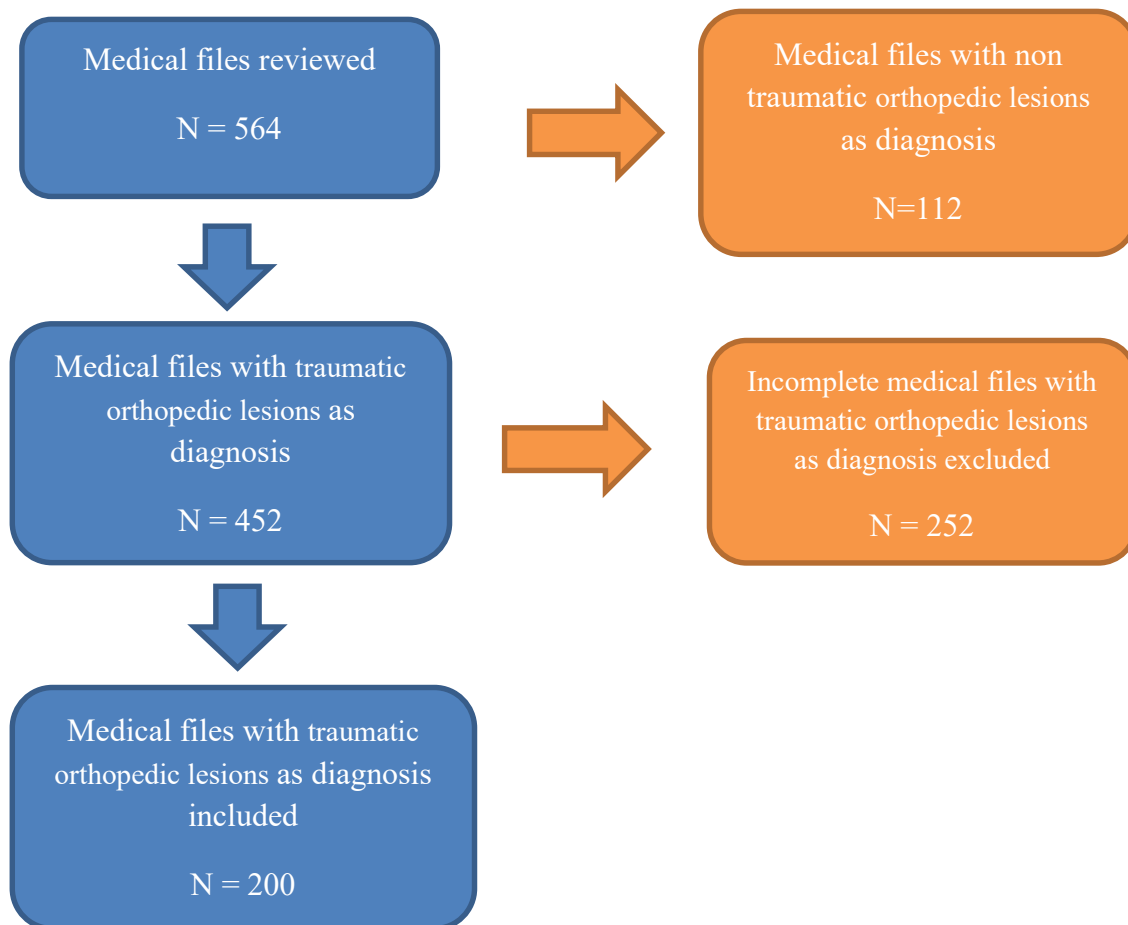


Figure 6: Recrutement diagram

These medical records varied in their socio-demographic data as shown in the table II below.

IV.2. SOCIODEMOGRAPHIC PROFILE

The sex ratio was 1:1.63. The rest of the information are displayed in the table II below.

Table II: Sociodemographic data

Variable	Modality	Frequency N	Percent n(%)
Age	Less than 10	4	2.0 (2.0)
	11-20	12	6.0 (6.0)
	21-30	37	18.5 (18.5)
	31-40	59	29.5 (29.5)
	41-50	36	18.0 (18.0)
	51-60	21	10.5 (10.5)
	61-70	20	10.0 (10.0)
	71-80	7	3.5 (3.5)
	81 and more	4	20.0 (20.0)
Occupation	Jobless	1	8 (8)
	Private	30	33 (33)
	Public	20	27 (27)
	Retired	6	3 (3)
	Student	43	29 (29)

Most patient (29.5%) were in the age group 31-40 and were working in the private sector implying that more risks are taken in this sector.

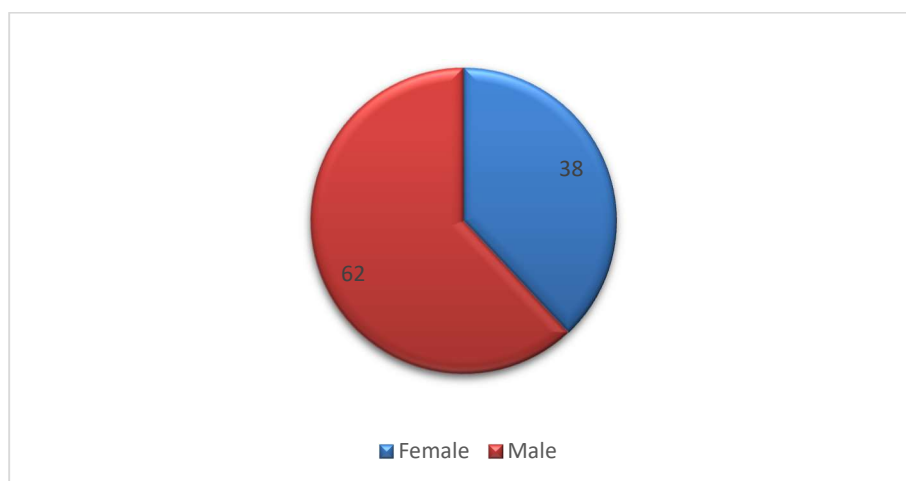


Figure 7: Sex distribution.

IV.3. PATHOLOGIC PROFILE

RTA represented the most frequent etiology of traumatic injury in the orthopedic unit with 79% of cases. The lower limb and the superior limb were the most affected body part with 85.2% cases. Also fractures were the most encountered trauma type with 91.5%. Moreover the operative treatment was done in 91% of cases. Furthermore the surgical act that was mostly realized was screw plate. Splint and reduction constituted 81% of the orthopedic treatment delivered. Beside the mean awaiting time for surgery is 7.27 days and a standard deviation of ± 6.08 days.

IV.4. SAFETY

Safety is the foundation upon which all other aspects of quality care are built. Various perspectives describing this attribute considered the environmental and physiological factors of a healthcare event. Safety indicators include: Outcome, accurate medication administration, and onset of surgery-related complications.

IV.5. CONTINUITY

For providers in a vertically integrated system of care, the contrasting ideal is the delivery of a seamless service through integration, coordination. That is multidisciplinary team working, information on past encounters with health care providers, the number of discrete encounters with the healthcare provider.

IV.6. EFFICACY

Efficacy refers to the effectiveness of an intervention in providing the best result for the patient, based on actual medical knowledge and guided by conclusive data [41].

IV.7. QUALITY OF CARE OF ORTHOPEDIC UNIT

The average ratings of 2.91 (sd = ± 0.38), 2.69 (sd = ± 0.51) and 2.98 (sd = ± 0.14) out of 3 were obtained in the dimension of efficacy, safety and continuity respectively. This gives an estimated quality of care of 2.86 out of 3. Further details are seen in table VII.

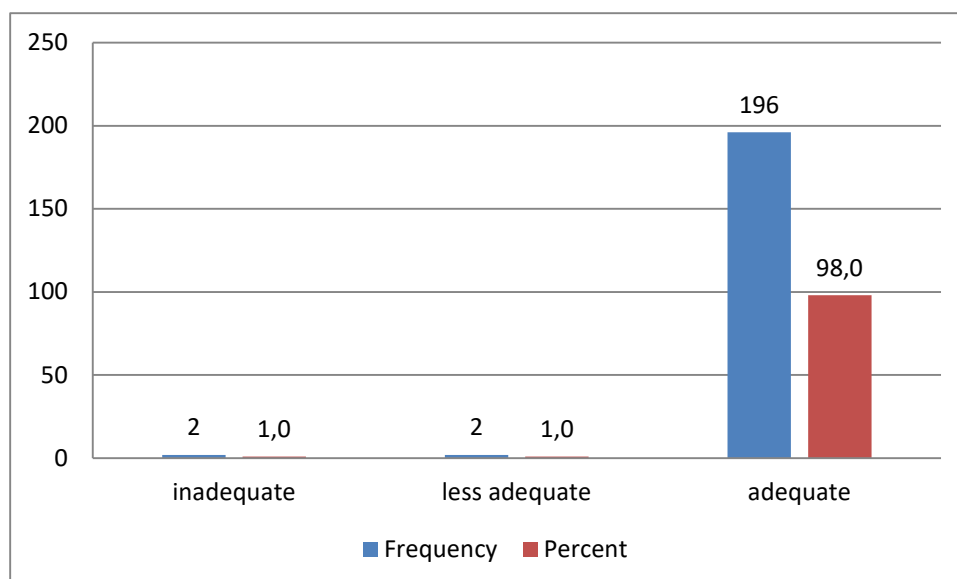


Figure 8: Overall quality of care

Only 2% of the cases in the study did not have an adequate level of care.

IV.8. MANAGEMENT OF RESOURCES

IV.8.1. Human resources

The medical staff added up to 40. Beside the sex ratio was 1:1, the rest is shown in the table VIII below.

Table VIII: Data on human resources

Variable	Modality	Frequency N	Percentage n(%)
Experience in number of years in the service	Less than 1year	8	20 (20)
	1-2years	17	42.5(42.5)
	3-4years	9	22.5 (22.5)
	5-6years	1	2.5(2.5)
	7-8years	1	2.5(2.5)
	9-10years	1	2.5(2.5)
	Other	3	7.5(7.5)
Sex	Male	20	50.0 (50.0)
	Female	20	50.0 (50.0)
Continuous training programme	Online courses	0	0.0 (0.0)
	Surgical skill training programme	0	0.0 (0.0)
	Orthopedic congress	18	32.10(32.10)
	Orthopedic classes	17	30.40(30.40)
	All of the above	0	0.0 (0.0)
	None	21	37.5 (37.5)

IV.8.2. Material resources

❖ Technical equipment

Table IX: Data on technical equipment

Variable	Modality	Frequency	Percentage n(%)
Adequacy	Suitable	35	97.1(97.1)
	Less suitable	1	2.9 (2.9)
	Not suitable	0	0 (0.0)
Accessibility	Available	15	37.5 (37.5)
	Less available	21	52.5 (51.2)
	Unavailable	4	10.0 (10.0)
State	Fit	25	71.4 (71.4)
	Less fit	8	22.9 (22.9)
	Worn out	2	5.7 (5.7)

❖ Rolling stock

Concerning the rolling stock material 100% was adequate, 16.7% was accessible and most of it that is 100% was in a less fit or worn out state.

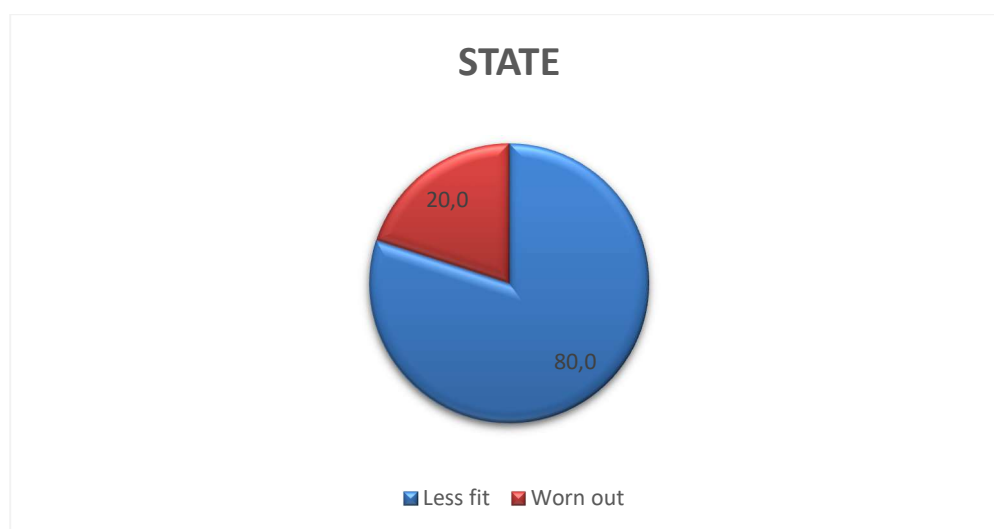


Figure 9: State of rolling stock

IV.8.3. Unit and establishment

Table X: State of hospitalization rooms

Variable	PRIVATE ROOM I-II	SHARING ROOMS I-XI
Light	good	Good
Ventilation	yes	Yes
Toilettes	present	Present

All the rooms were equipped with air conditioner and all the walls were painted.

Chapter V : DISCUSSION

V.1. LIMITS OF THE STUDY

- The study only focused on one hospital and did not cover district hospitals which are expected to treat a substantial number of trauma cases from rural areas. Nor did the study address prehospital care.
- The importance of the prehospital phase of trauma management, although not covered in our study, must be underlined.
- Another limitation was the incompleteness of medical report filling which introduced a bias since some of the medical files recruited retrospectively had to be excluded due to lack of certain criteria such as; completeness of content, accuracy, timeliness.

V.2. PATHOLOGICAL PROFILE

The main age group affected was between 31-40 years with 29.5% of cases which is similar to a study carried by author [12]. This frequency in young adults could be explained by the hyperactivity of this segment of the population (which is therefore more exposed to trauma). The median age in our study was 39 years, which is identical to a study conducted in 2019 [13], with an interquartile range of 30 to 53 years and extremes ranged from 6 to 87 years.

Male sex was the majority with 62%, a sex ratio of 1:1.63. This result is lower than that of studies [4,13], which observed a ratio of 2.5 and 2.6 respectively. The male predominance in our study can be explained by the fact that by their nature, males are more active and likely to be involved in riskier activities.

The most common cause of traumatic orthopedic injury was RTA with 79% that is superposable to [4,13] with 78.37% and 79.3% respectively. The hostile African environment would certainly explain this predominance of RTA, that is the poor state of the roads, the disorganization of emergency services and transport of the wounded, the non-generalization of road safety rules (the mandatory wearing of seat belts elsewhere), in short poverty and all its corollaries.

Majority of the fractures were closed fracture 54.41%, while open fractures accounted for 41.5% of the cases. The fact that fractures are the commonest trauma type is because most trauma happened through direct mechanism 90.5%, suggesting a high amount of energy was imparted to the body during the accident. In our study, the lower limb was the predominant body part affected for 70.76% followed by 14.41% for the superior limb. This trauma predominance to the lower limb was reported by the study [7] as 45.7% against 21.6% while study [6] objectivated 56.7% against 39.9%. The preponderance of limbs trauma is due to the fact that extremities are more exposed and thus more susceptible to be injured, usually due to direct trauma in vehicle and bike accidents or falls. It is worth noting that the lower limb long

bones are the main organs of locomotion which are essential for daily activities. Moreover the operative treatment was done in 91% of cases which is higher when compared to [6]. This is so because the commonest trauma type encountered were lower and superior limb fractures. Such fractures lead to serious long term complications if they are not managed surgically. The mostly used surgical methods were plates and screws 30%, external fixations 21% and intramedullary nailing of long bones 17%, this is similar to 28.5%, 21.5%, 48.7% for each surgical method respectively as demodtrated by [6]. Thus such implants should be made readily available in the Orthopedic Surgery Unit to ease the treatment of fractures. The most common orthopedic treatment method was reduction and splinting (55.93%). Training of medical personnel should lay emphasis on the techniques of casting fractures as definitive or temporal treatment. Beside the mean awaiting time for surgery is 7.27 days and a standard deviation of ± 6.08 days this must be reduced so as to minimize the advent of complications.

V.3. MANAGEMENT RESSOURCES

V.3.1. Human resources

During the first week of data collection in the Orthopedic Surgery Unit we had 3 surgeons, 14 resident, 7 registerd nurses, 13 assistant nurses, 3 medical student for a total of 40 medical staff members to which the 13 admission rooms (containing 50 beds) were divided accordingly. This is twice the number of personnel of [67]. This may be due to the hospital size and the increasing incidence of musculoskeletal trauma hence more medical staff members have to recruited to match the demand and provide proper care. The median age of the experienced number of years in the service was 3.2 years with a standard deviation of ± 3.49 . The sex ratio was 1:1 which shows that recruitment is open to both sexes filling the employment profil. Due to lack of financial means, these residents neither participated in symposia, seminars in other countries nor could subscribe to journals. However, continuous education was provided by: The daily staff of the department, the weekly staff of the Department of Orthopedic Surgery, orthopedic congress and orthopedic lectures (for residents).

Also these nurses had no financial support for subscription to journals and inscription to seminars nor had congresses on nursing in orthopedic departement. Nevertheless continuous training program was assured by weekly staff orthopedic nursing practices such as: wound dressing, surveillance following surgery. Moreover knowledge on monitoring parameters following surgery, aseptic measures before entering the OR and management of contaminated waste was assessed. All the medical staff gave accurate and correct answers.

V.3.2. Material resources

The study helped us to find out that 71.4% of the technical equipment was fit and in good state, 97.2% adequate these percentages are superior when compared to [67] which had 65.69% and 92.31% respectively. Due to the level of Central hospital in the health pyramid the orthopedic department of the latter benefits from the financial advantages put at its disposal. Also a functionality state of 71.4% demonstrate and an adequacy of 97.2% shows a lack of a orthopedic table, a lack of a transport respirator in the operating room, poor condition and insufficient boxes of surgical instruments. Accessibility of 37.5% implies that the store must be replenished, worn out should be discarded and maintenance be assured for the less fit equipment. On the other hand rolling stock material are mostly weary and scarce therefore must be renewed.

V.4. CARE PROCEDURES

Good management and organizational practices are essential parts of service governance. The service must set up the bodies in accordance with the provisions in power. Most of the care procedures in place were regularly implemented, a few on the other hand were often enacted such as: the recording of post operative notes and cue acquisition finding in patients files which is essential for care management of the patient. Also limiting the entry to the OR when surgery has began.

V.5. UNIT AND ESTABLISHMENT

The Orthopedic Surgery Unit. The latter consist of ; 8 Offices: 1 for the chief of service, 2 for the orthopedic surgeons, 2 for the head nurses which also serve as secretaryship, 1 for the residents, 1 for the nurses and nursing aid, and the last for orthopedic staff. Also the unit has 13 hospitalisation rooms with 50 beds: 11 sharing room containing 48 beds and 2 private rooms containing 1 bed each. All the rooms are equipped with a modern toilet but the rooms where not clean with the presence of cub webs. The unit shares 4 ORs with other surgery specialties. Outpatient consultations take place on Tuesday and Thursday. The visit is done every morning, hospitalizations are done every day. The service staff takes place on Tuesdays and Thursdays, every week and the counter visit is carried out by the guard team. The programming of the patients to be operated is done every Friday. The different interventions take place every Monday, Wednesday, Friday for scheduled patients.

V.6. QUALITY OF CARE OF ORTHOPEDIC UNIT

A favourable evolution of 98% was found in this study which is inferior to 100% obtain by [68]. The quality of care of the orthopedic unit in this study was high 98%. This is superior to that obtained by [67] that is 79.13% and superposable to [12] who had 98.1%. This can be explained by the fact that other care quality criteria such as effectiveness, patient-centeredness, equity, and integrate were not evaluated and patient opinion was not taken into account in the study. Also the outcome and the evolution were mostly favourable.

CONCLUSION

The present study was conducted to assess the care quality of the Orthopedic Surgery Unit at Central Hospital of Yaounde. Medical care is delivered by a complex but fragile system, which has still not been optimally thought out. A thorough reflection on the functioning of this system, on the nature of its failures and their causes as well as on the means capable of preventing them is essential. Consideration of the complexity of systems of care, critical analysis of the processes that make them up, and the implementation of learning loops (plan-do-evaluate-analyze) are three components of a constructive approach to quality of care.

This study demonstrated a useful approach to evaluating the quality of care of the Orthopedic Surgery Unit. As such, the research hypothesis formulated at the beginning of the study was surpassed. The high level of care quality recorded might have been because other criteria such as effectiveness, patient-centered, equity, integrated.

Data analysis led to the conclusion that quality of care at the Orthopedic Surgery Unit at Central Hospital of Yaounde is high in term of efficacy, continuity but low in safety which is mostly attributable to the health environment and the laxity in some procedures in power.

Though the objectif of the study was attained the satisfaction of patient was not taken into account which is a key component in care quality. An ideal research should take into consideration patients' satisfaction levels and more quality criteria. However this approach might be more strenuous and more time consuming, and necessitate more evaluating tools.

RECOMMENDATIONS

To the Ministry of transport:

- Make road safety a priority through the construction of high-traffic roads and motorways, continuous road signs, the practice of unannounced visits to the car fleet, greater rigour in the issuance of driving licences.
- Intensify public awareness campaigns for the respect of the rules of the road. Periodically publish statistics on RTA in order to inform the population about the seriousness of this scourge; Require the wearing of seat belts in order to reduce the consequences related to RTA caused by poor quality roads.

To the Ministry of public health:

- The creation of committees and agencies for quality care evaluation.

To the Board of Directors of the CHY:

- Provide the Orthopedic surgery unit with an adequate technical facilities with an emergency reception room worthy of the name, a laboratory of analysis functional on a continuous basis for a better care of the injured improvement of the conditions of reception of the patient.
- Improvement of the conditions of accommodation of the sick by the creation of adequate rooms for hospitalization (showers and toilets).
- Provision of the service with more efficient means and techniques better adapted to our context.
- Strengthening the skills and knowledge of medical staff through the financing of orthopedic congresses in other countries.
- More effort must be place in the cleaning of hospitalization rooms.

To the medical staff.

- Acceptance of medical evaluation as a means of perfecting one's practices and not as a "degrading physical and/or intellectual control".
- Collaboration and involvement of all staff in the care of patients.
- Correct performance by each staff of the tasks assigned to them.
- Rigorous application of medical procedures and techniques to minimize perioperative complications.

To researchers

Following this study, which is a first in this area to our knowledge, we recommend that the evaluation of the Orthopedic Surgical Unit in our context must include as quantifiable criteria the following:

- The different activities carried out by the service (consultation, hospitalization and operative activities).
- The duration of the preoperative and postoperative stay in the department.
- Causes and severities of perioperative complications
- The number and exact causes of operative death.
- The satisfaction of the surgeon with the act performed and the means at his disposal for the intervention.
- The justification for further treatment and examinations.
- The opinion of the patient at the end of his hospital stay on: his reception, his accommodation, on the staff, the care, the stay; medical record information and archiving.

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APPENDICES

Annexe 1:Outil de collecte

**Evaluation of the quality of care at the orthopedic surgery Unit
at Central Hospital in Yaounde**

PATHOLOGIC PROFIL DATA SHEET

Investigator: ___/___

Date: ___/___/___

Code: ___/___/___

A. Socio demographic data

1) Age: _____

2) Sex: 1- Female 2- Male

3) Occupation: _____

B. Pathologic profile

1) **Etiology:** 1- Road traffic accident 2- Occupational accident 3- Sport injury
4- Domestic accident 5- Physical assault 6- Other _____

2) **Mechanism:** 1- Direct 2- Indirect

3) **Trauma characteristic:**

a) **Brain and skull:** 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Bruises 4- Wound
5- Hematoma 6- Other _____

b) **Cervical spine:** 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Other _____

c) **Thoracic spine:** 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Other _____

d) **Lumbar spine:** 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Other _____

e) Sacral bones: 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Other _____

f) Coccyx bones: 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Other _____

g) Thorax: 1=Yes 2= No

If 1 ; 1- Ribs fracture 2- Clavicular fracture 3- Flail chest 4- Pneumothorax
5- Bruises 6- Wound 7- Dislocation 8- Hematoma 9- Other _____

h) Superior limb: 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Sprain 7- Ruptured or torn tendon 8- Ruptured or torn ligament
9- Traumatic amputation 10- Crushed 11- Other _____

i) Pelvis: 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Sacro-iliac disjunction 4- Pubic
symphysis disjunction 5- Other _____

j) Lower limb: 1=Yes 2= No

If 1 ; 1- Open fracture 2- Closed fracture 3- Dislocation 4- Bruises
5- Wound 6- Sprain 7- Ruptured or torn tendon 8- Ruptured or torn ligament
9- Traumatic amputation 10- Crushed 11- Other _____

4) **Associated lesion**: 1=Yes 2= No

If yes list ; _____

5) **Poly trauma**: 1- Yes 2- No

6) **Poly fracture**: 1- Yes 2- No

7) **Diagnosis on entry**:

Complementary exam

- 8) **Complementary exam done:** 1- Yes 2- No
- 9) **Radiologic exam done:** 1- X-ray 2- CT-scan 3- MRI 4- Ultrasound
5- Other _____
- 10) **Biologic exam done:** 1- FBC 2- blood glucose level 3- Blood typing
4- Blood electrolyte test 5- liver function test 6- PT/ATT 7- BUC
8- HIV test 9- SR 10- CRP 11- Other
- 11) **Medical past history:** 1- Remarkable 2- Unremarkable
b) If 1 list _____
- 12) **Surgical past history:** 1- Remarkable 2- Unremarkable
b) If 1 list _____
- 13) **Onset of Complication prior present surgery:** 1- Yes 2- No
b) If 1 list _____

ORTHOPEDIC AND SURGICAL MANAGEMENT TREATMENT

- 15) **Orthopedic treatment:** 1- Yes 2- No
- 16) **Type of orthopedic treatment:** 1- Splint 2- Cast 3- Skin traction
4- Skeletal traction 5- Closed reduction 6- Other _____
- 17) **Surgical treatment:** 1- Yes 2- No
- 18) **Time awaiting surgery:** _____
- 19) **Type of surgical intervention:** 1- Elective 2- Emergent
- 20) **Type of surgery base on Altemeir classification**
1- Clean 2- Clean-contaminated 3- Contaminated 4- Infected
- 21) **Indication:** _____
- 22) **Type of anesthesia:** 1- General anesthesia 2- Spinal anesthesia
3- Epidural anesthesia 4- local anesthesia
- 23) **Surgical intervention period:** _____
- 24) **Qualification of the operating physician:** 1- Surgeon 2- General practitioner
3- Nurse 4- Resident 5- Other _____
- 25) **Qualification of the surgeon's aid:** 1- Surgeon 2- General practitioner

3- Nurse 4- Resident 5- Other _____

26) **Qualification of the anesthetist:** 1- Anesthetist physician 2- General practitioner
3- Nurse 4- Resident 5- Other _____

27) **Surgical act realized:**

1- Pinning 2- Nailing/ Screwing 3- Screw plate 4- OREF 5- CREF
6- CRIF 7- Debridement 8- Amputation 9- ligament suturing
10- Tendon suturing 11- Tendinoplasty 12- Arthroplasty
13- Stump regularization 14- Muscle flap transposition
15- Tension band wiring 16- Other _____

28) **Complication:** 1- Yes 2- No

29) **Per-operative complication:** 1- Per-operative cardiac arrest 2- Hemorrhagic shock
3- Pulmonary embolism 4- Other _____

30) **Post-operative complication:**

Immediate; 1- Bleeding 2- Loco regional stiffness 3- Wound dehiscence
4- cardiovascular disorders 5- Other _____

Early; 6- Skin infection 7- DVT 8- Pressure sores
9- Compartment syndrome 10- Fever 11- Secondary displacement
12- Skin infection 13- Other _____

Late; 14- Arthritis 15- Pseudarthrosis 16- Ostitis 17- Skin necrosis
18- callus 19- Other _____

PHARMACOLOGICAL TREATMENT

31) **Antibiotic prophylaxis before surgery:** 1- Yes 2- No

32) a) **Pharmacologic treatment:** A- Antibiotics B- Anti-inflammatory C- Analgesic
D- Thromboembolic prophylaxis E- anti tetanic serum/ vaccin

b) **If antibiotic what type?** 1- Beta-lactam 2- Macrolide 3- Fluoroquinolones
4- Tetracyclines 5- Aminoglycosides 6- Sulfonamides
7- Nitroimidazole 8- Other _____

c) **Antibiotic dosage:** _____

d) **Duration of antibiotic treatment:** _____

e) **Number of antibiotics prescribed:** 1- Single antibiotic therapy
2- Double antibiotic therapy 3- Triple antibiotic therapy 4- Other _____

33) **Admission period:** _____

34) **Evolution:** 1- Favourable 2- Unfavourable

35) a) **Outcome:** 1- Hospital exit 2- Dead 3- Other _____

b) **If dead precise the cause:** 1- Toxic shock 2- Cardiac arrest
3- Other _____

36) a) **Readmission:** 1- Yes 2- No

b) **Precise the cause:** 1- Pain 2- Infection 3- Other _____

37) **Observations:** _____

EVALUATION GRID OF ORTHOPEDIC PROCEDURE

(OR operating room, CE complementary exam, ISS Injury severity score, AIS abbreviated injury scale, SOAP subjective objective assessment and plan)

Component	Indicators	Answer
1) Diagnosis		
	Attainment of nursing care to newly admitted patient	Always Often Rarely Never
	Frequency of patient re-evaluation by resident/doctors	Always Often Rarely Never
	The use of the SOAP method in diagnosis	Always Often Rarely Never
	The use of proper equipment for hemodynamic parameter measurement	Always Often Rarely Never
	Assessment of pain characteristics	Always Often Rarely Never
	Assessment trauma part function using maneuvers and movements	Always Often Rarely Never
	Evaluation of injury severity in mono-trauma using different body part classification as proposed by literature	Always Often Rarely Never
	Evaluation of injury severity in poly-trauma using ISS or AIS	Always Often Rarely Never
	The use of classification method to assess trauma	Always Often Rarely Never
	The recording of cue acquisition findings in the patient file	Always Often Rarely

		Never
	Pruning and choosing of hypothesis is based on actual literature knowledge	Always Often Rarely Never
	Care prioritization base on the patient state	Always Often Rarely Never
2) Decision		
	Surgeon and medical staff consertation	Always Often Rarely Never
	Consideration of patient opinion in decision making	Always Often Rarely Never
	Ponder indication during decision making	Always Often Rarely Never
3) Operative		
	Anesthetist consultation	Always Often Rarely Never
	Surgeon's consultation	Always Often Rarely Never
	Verification of patient's identity and cross checking of the patient's file and from	Always Often Rarely Never
	Filling of patient consent form	Always Often Rarely Never
	Preoperative CE investigation	Always Often Rarely Never

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	Pre operative re-evaluation	Always Often Rarely Never
	Patient education and information about interventions and procedures	Always Often Rarely Never
	Hand washing and scrubbing	Always Often Rarely Never
	Wearing of protective shoe and face mask sterile gown, gloves and protective eye glasses,	Always Often Rarely Never
	Psychological preparation and counselling on pre and postoperative nutrition by the doctor	Always Often Rarely Never
	Use of pre-operative checklist	Always Often Rarely Never
	Cleaning of surgical site with chlorhexidine	Always Often Rarely Never
	Disinfection of operation site and covering with sterile cloth	Always Often Rarely Never
	Keeping away non sterile personnel from sterile field and limiting entry to OR when surgery has started	Always Often Rarely Never
	Monitoring of vital parameters in the OR	Always Often Rarely Never
	Sponge and instrument counts	Always Often Rarely Never
	Post-operative checklist	Always Often

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		Rarely Never
	Postoperative notes and operation register	Always Often Rarely Never
	Postoperative patient assessment and monitoring	Always Often Rarely Never
	Antibiotic treatment Prophylactic thromboembolic disease treatment Operation site dressing	Always Often Rarely Never
	Analgesic treatment	Always Often Rarely Never
	CE investigation and operation site evaluation	Always Often Rarely Never

References

XXXIV

**Evaluation of the quality of care at the orthopedic surgery Unit
at Central Hospital in Yaounde**

Investigator: ___/___/___

Date: ___/___/___

RESOURCES OBSERVATION CHART

Material resources	Adequacy:1=suitable 2=less suitable 3=not suitable Availability:1=available 2=less available 3=Unavailable State:1=fit 2=less fit 3=worn out			
	Items	Adequacy	Availability	State
Rolling stock	1)Wheelchair	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	2)Drip stand	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	3)Trolley	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	4)Walking frame	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	5)Gurney	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	6)Orthopedic bed	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
Technical equipment	7)Functional anesthesia machines	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	8)Adult oropharyngeal airway	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	9)Pediatric oropharyngeal airway	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	10)Adult endotracheal tube	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	11)Pediatric endotracheal tube	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	12)Adult laryngoscope	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	13)Pediatric laryngoscope	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	14)Adult facemask bag valve	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	15)Pediatric facemask bag valve	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	16)Difficult airway kit (LMA)	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	17)Adult Magill forceps	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	18)Pediatric Magill forceps	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	19)Blood pressure monitor or cuff	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	20)Pulse oximetry	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	21)Stethoscope	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	22)Suction apparatus	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	23)Thermometer	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	24)Nasogastric Tube	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	25)Light source	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	26)Chest tube	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	27)Electrocautery	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	28)Autoclave/Sterilizer	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	29)Orthopedic extension devices	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	30)Orthopedic operating table	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	31)X-ray image intensifier	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	32)Osteosynthesis kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	33)Orthopedic surgery kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	34)Soft tissue surgery kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	35)Orthopedic surgery implants and devices	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	36)Bone substitutes	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	37)Bone substitutes mixer	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	38)Cast saws	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	39)Protective dressing and accessories,gown ,gloves, masks)	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	40)Surgical power tools	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	41)Traumatology instrument kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	42)Pediatric traumatology instrument kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>

References
XXXV

	43)Sharps disposal container	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	44)Non-sterile Examination Gloves	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	45)Bone biopsy instrument kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>
	46) Dressing kit	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>	1- <input type="checkbox"/> 2- <input type="checkbox"/> 3- <input type="checkbox"/>

Evaluation of the quality of care at the orthopedic surgery Unit at Central Hospital in Yaounde

HUMAN RESOURCES DATA SHEET

Investigator: ___/___

Date: ___/___/___

Code: ___/___/___

1) Care giver qualification:

- 1- Surgeon
- 2- General practitioner
- 3- Registered nurse
- 4- Resident
- 5- Medical student
- 6- Student nurse
- 7- Other _____

2) Experience in number of years in the service:

- 1- less than 1year
- 2- 1-2years
- 3- 3-4 years
- 4- 5-6 years
- 5- 7-8 years
- 6- 9-10 years
- 7- Other _____

3) Sex:

- 1- Male
- 2- Female

4) Continuous training programme:

- 1- Online Courses
- 2- Surgical skill training programme
- 3- Orthopedic congress
- 4- Orthopedic classes
- 5- All of the above
- 6- Other _____

5) Assessment tool to evaluate consciousness:

- 1- Glasgow coma scale
- 2- Physical appearance
- 3- Other _____

6) Some of the aseptic technique applied by the nursing and medical staff before entering the OR:

- 1- Hand scrubbing and washing
- 2- Dressing with protective gown, mask and shoes
- 3- Other _____

7) Instrument use to monitor the patient's vital parameter in the OR:

- 1- Pulse oximeter
- 2- Electrocardiogram
- 3- Inflatable blood pressure cuff
- 4- Other _____

8) Procedures established for the proper use of the OR:

- 1- Keep OR uncluttered and easy to clean
- 2- Keep to a minimum the number of people allowed to enter the O.R. especially after an operation has started
- 3- Between cases, clean and disinfect the table and instrument surfaces
- 4- Store some sutures and extra equipment in the O.R. to decrease the need for people to enter and leave the O.R. during a case
- 5- Other _____

9) Elements of postoperative monitoring:

- 1- Temperature
- 2- Blood pressure
- 3- Pulse
- 4- Other _____

10) Procedures for clinical waste disposal:

- 1- Make separate disposal containers available where waste is created so that staff can sort the waste as it is being discarded.
- 2- Disposable containers should be placed away from patients reach
- 3- Other _____

Annexe 2: Ethical Clearance

UNIVERSITÉ DE YAOUNDÉ I
FACULTÉ DE MÉDECINE ET DES SCIENCES BIOMÉDICALES
COMITÉ INSTITUTIONNEL D'ÉTHIQUE DE LA RECHERCHE
Tel/ fax : 22 31-05-86 · 22 311224
Email: decanatfmsb@hotmail.com
Ref. : N° AAZ /UY1/FM/B/VDRC/CSD



THE UNIVERSITY OF YAOUNDE I
FACULTY OF MEDICINE AND BIOMEDICAL SCIENCES
INSTITUTIONAL ETHICAL REVIEW BOARD

CLAIRANCE ÉTHIQUE 28 AVR 2022

Le COMITÉ INSTITUTIONNEL D'ÉTHIQUE DE LA RECHERCHE (CIER) de la FMSB a examiné
La demahde de la clairance éthique soumise par :

**M.Mme: MBONO AKOUMA CONSTANTIN
WILFRIED ARTHUR**

Matricule: 18M002

Travaillant sous la direction de :

- Pr **ESSI Marie José**
- Pr **HANDY EONE Daniel**

Concernant le projet de recherche intitulé : **EVALUATION OF THE QUALITY OF CARE AT THE
ORTHOPEDIC SURGERY UNIT AT CENTRAL HOSPITAL
IN YAOUNDE**

Les principales observations sont les suivantes

Evaluation scientifique	
Evaluation de la convenance institutionnelle/valeur sociale	
Equilibre des risques et des bénéfices	
Respect du consentement libre et éclairé	
Respect de la vie privée et des renseignements personnels (confidentialité) :	
Respect de la justice dans le choix des sujets	
Respect des personnes vulnérables :	
Réduction des inconvénients/optimalisation des avantages	
Gestion des compensations financières des sujets	
Gestion des conflits d'intérêt impliquant le chercheur	

Pour toutes ces raisons, le CIER émet un avis favorable sous réserve des modifications recommandées dans la grille d'évaluation scientifique.

L'équipe de recherche est responsable du respect du protocole approuvé et ne devra pas y apporter d'amendement sans avis favorable du CIER. Elle devra collaborer avec le CIER lorsque nécessaire, pour le suivi de la mise en œuvre dudit protocole. La clairance éthique peut être retirée en cas de non - respect de la réglementation ou des recommandations sus évoquées.

En foi de quoi la présente clairance éthique est délivrée pour servir et valloir ce que de droit


LE PRESIDENT DU COMITE ETHIQUE
PROFESSEUR
M. F. O. Oboama

Annexe 3: Administrative autorisation

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTERE DE LA SANTE PUBLIQUE

SECRETARIAT GENERAL

DIRECTION DE L'HOPITAL CENTRAL DE YAOUNDE

UNITE ADMINISTRATIVE ET FINANCIERE

N°2022/143/AR/MINSANTE/SG/DHCY/UAF



REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF PUBLIC HEALTH

SECRETARIAT GENERAL

DIRECTORATE OF CENTRAL HOSPITAL

ADMINISTRATIVE AND FINANCIAL UNIT

Yaoundé, le 01 MARS 2022

AUTORISATION DE RECHERCHE

Je soussigné, **Professeur Pierre Joseph FOUDA**, Directeur de l'Hôpital Central de Yaoundé, accorde une autorisation de recherche du, sous la direction de *Pr ESSI Marie José* et la codirection de *Pr HANDY EONE Daniel* à **M./Mme MBONO AKOUMA Constatin Wilfried Arthur**, étudiant(e) niveau 7 Médecine Générale à la Faculté de Médecine et des Sciences Biomédicales de l'Université de Yaoundé I, sur le thème :
« **Evaluation of the quality of care at the orthopedic surgery unit at Central Hospital in Yaounde** ».

L'intéressé(e) est tenu(e) au strict respect du règlement intérieur de l'Hôpital Central de Yaoundé et s'engage à déposer un exemplaire de ladite thèse à la Direction dudit hôpital après correction.

En foi de quoi, la présente autorisation lui est délivrée pour servir et valoir ce que de droit. /-



Le Directeur,

Pierre Joseph FOUDA

Yaoundé le 7 décembre 2021

MBONO AKOUMA Constatin Wilfried
Arthur

Etudiant 7^e année en médecine
générale

Faculté de Médecine et des
sciences biomédicales/ université

A

Monsieur le Directeur
Général de l'Hôpital Centrale de
Yaoundé

Objet : Autorisation de recherche

Monsieur,

J'ai l'honneur de venir auprès de votre haute bienveillance solliciter une autorisation de collecte de données dans la ville de Yaoundé.

En effet, je suis étudiant en 7^{ème} année d'étude médicale filière médecine générale, à la Faculté de Médecine et des Sciences Biomédicales de Yaoundé 1, et j'effectue une thèse dont le thème est le suivant :

«Evaluation de la qualité des soins dans le service de Chirurgie Orthopédique et Traumatologique de l'Hôpital Centrale de Yaoundé». Ce travail est effectué sous l'encadrement du Pr ESSI Marie-José et Pr Handy Eone Daniel.

Dans l'attente d'une suite favorable, veuillez agréer Monsieur le Directeur, l'expression de ma plus haute considération.

Pièce jointe : protocole de recherche

MBONO AKOUMA Constatin
Wilfried Arthur

Demande 1 : clairance éthique au comité institutionnel d'éthique et de la recherche de la FMSB

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

UNIVERSITE DE YAOUNDE I

FACULTE DE MEDECINE ET
DES SCIENCES BIOMEDICALES



REPUBLIC OF CAMEROON
Peace-Work-Fatherland

THE UNIVERSITY OF YAOUNDE I

FACULTY OF MEDICINE AND
BIOMEDICAL SCIENCES

Yaoundé le 7 décembre 2021

A

Madame la Présidente du Comité
d' Ethique de la Faculté de
Médecine et

Objet : Demande de Clairance éthique.

Madame

J'ai l'honneur de venir auprès de votre haute bienveillance solliciter une clairance éthique.

En effet, je suis étudiant en 7^{ème} année d'études médicales filière médecine générale à la Faculté de Médecine et des Sciences Biomédicales de l'Université de Yaoundé I. J'effectue un travail de thèse en vue d'obtention du grade de Docteur en Médecine générale intitulé :

«Evaluation de la qualité des soins dans le service de Chirurgie Orthopédique et Traumatologique de l'Hôpital Centrale de Yaounde » dirigé par Pr ESSI Marie-José, Pr Handy Eone Daniel.

Le but de ce travail est d'analyser l'adéquation entre la qualité des soins dans le service de Chirurgie Orthopédique et Traumatologique de l'Hôpital Central de Yaoundé et les normes standard, j'ai besoin de ce document pour pouvoir y mener l'étude.

Je joins à ma demande

- une copie du résumé du protocole de recherche
- une photocopie de mon reçu de paiement des droits universitaires.

Dans l'attente d'une suite favorable, veuillez agréer Madame l'expression de mon profond respect.

MBONO AKOUMA Constantin
Wilfried Arthur