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Imperatives of trauma centres; designating Irrua Specialist Teaching Hospital as a level 1 trauma centre in Nigeria.

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Abstract

Trauma centres are specialized hospital departments designed to provide 24/7 advanced, comprehensive care for patients with critical, life-threatening injuries, such as severe falls, motor vehicle crashes, or gunshot wounds. These specialized facilities, often classified by levels (I-V), are staffed by trauma surgeons, specialized nurses, and support teams to reduce mortality and disability.

Keywords: *Trauma, trauma centres, emergencies, ISTH.*

Introduction

A trauma center, is a hospital equipped and staffed to provide care for patients suffering from major traumatic injuries such as falls, motor vehicle collisions, or gunshot wounds. The term "trauma center" may be used incorrectly to refer to an emergency department (also known as a "casualty department" or "accident and emergency") that lacks the presence of specialized services or certification to care for victims of major trauma.

In the United States, a hospital can receive trauma center status by meeting specific criteria established by the American College of Surgeons (ACS) and passing a site review by the Verification Review Committee.[1] The operation of a trauma center is often expensive and some areas may be underserved by trauma centers because of that expense.[2] As there is no way to schedule the need for emergency services, patient traffic at trauma centers can vary widely.[3]

The highest levels of trauma centers have access to specialist medical and nursing care, ncluding emergency medicine, trauma surgery, oral and maxillofacial surgery, critical care, neurosurgery, orthopedic surgery, anesthesiology, and radiology, as well as a wide variety of highly specialized and sophisticated surgical and diagnostic equipment.[4,5,6].

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This article critically analyses the readiness of Irrua Specialist Teaching Hospital to be designated a Level 1 trauma center.

Trauma centres in Nigeria

Based on information from the Federal Ministry of Health (FMOH) and Nigerian health journals, the primary facility operating as a top-level, dedicated, and comprehensive trauma center in Nigeria is National Trauma Centre, National Hospital Abuja. This is an 80-bed facility situated within the National Hospital, Abuja, which acts as a major tertiary center dedicated to trauma, featuring a 24-hour trauma team, 8-bed intensive care unit (ICU), 2 major operating theaters, and a helipad. It is recognized as a significant center for Advanced Trauma Training by the West African College of Surgeons. Other Major Trauma/Surgical Centres recognized by the Government include the Ondo State Trauma and Surgical Centre, Ondo, National Orthopaedic Hospital, Igbobi Lagos, National Orthopaedic Hospital Dala Kano, National Orthopaedic Hospital, Enugu, Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto, University of Maiduguri Teaching Hospital (UMTH) Maiduguri, and Solution Trauma Center, Anambra.

Classification of trauma centres

Trauma centers are classified into levels I through V, with Levels I and II offering the most comprehensive, 24/7 care for severe injuries, including surgical, research,

and rehabilitation capabilities. Levels III–V provide stabilization and transfer for patients, with lower levels focusing on, or only providing, initial stabilization and rapid transfer to higher-level facilities.

Level I

A Level I trauma center provides the highest level of surgical care to trauma patients. Being treated at a Level I trauma center can reduce mortality by 25% compared to a non-trauma center.[7] It has a full range of specialists and equipment available 24 hours a day[8] and admits a minimum required annual volume of severely injured patients.

A Level I trauma center is required to have a certain number of the following people on duty 24 hours a day at the hospital.

- Surgeons
- Emergency physicians
- Anesthesiologists
- Nurses
- Respiratory therapists
- An education program
- Preventive and outreach programs

Key elements include 24-hour in-house coverage by general surgeons and prompt availability of care in varying specialties—such as orthopedic surgery, cardiothoracic surgery, neurosurgery, plastic surgery, anesthesiology, emergency medicine, radiology, internal medicine, otolaryngology, oral and maxillofacial surgery, and critical care, which are needed to adequately respond and care for various forms of trauma that a patient may suffer, as well as provide rehabilitation services.[7]

Most Level I trauma centers are teaching hospitals/campuses. Additionally, a Level I center has a program of research, is a leader in trauma education and injury prevention, and is a referral resource for communities in nearby regions.[9] A trauma center must ensure that a general or trauma surgeon can respond to a patient's bedside within 15 minutes of notification at least 80% of the time.[10],[14] To satisfy this requirement, most Level I and many Level II centers have a surgeon in-house at all times.

A level I trauma center is a tertiary care hospital that provides comprehensive care from initial injury through rehabilitation. The requirements for this kind of facility include the following:

- 24-hour in-hospital access to general surgeons

- Specialty availability, including anesthesia, emergency medicine, intensive care unit (ICU), neurosurgery, orthopedic surgery, radiology, ophthalmology, and geriatric care

- Surgical expertise in cardiothoracic, vascular, hand, plastic, obstetric and gynecologic, otolaryngologic, and urologic surgery

- Referral center for community hospitals that require specialized trauma care

- Public health initiatives, including injury prevention programs

- Ongoing education for all professionals involved in trauma care

- Quality monitoring and improvement efforts

- Teaching and research in trauma management

- Identification and intervention for polysubstance use

- Mental health screening for individuals with traumatic injuries

- Minimum annual patient volume, treating at least 400 trauma cases or 240 patients with an Injury Severity Score (ISS) over 15

- Pediatric requirement, with level I pediatric trauma centers treating at least 200 trauma patients under 15 years of age annually

Level II

A Level II trauma center works in collaboration with a Level I center. It provides comprehensive trauma care and supplements the clinical expertise of a Level I institution. It provides 24-hour availability of all essential specialties, personnel, and equipment. Oftentimes, level II centers possess critical care services capable of caring for almost all injury types indefinitely. Minimum volume requirements may depend on local conditions. Such institutions are not required to have an ongoing program of research or a surgical residency program. [11]

Level III

A Level III trauma center does not have the full availability of specialists but has resources for emergency resuscitation, surgery, and intensive care of most trauma patients. A Level III center has transfer agreements with Level I or Level II trauma centers that provide back-up resources for the care of patients with exceptionally severe injuries, such as multiple trauma.[9]

Level IV

A Level IV trauma center exists in some states in which the resources do not exist for a Level III trauma center. It provides initial evaluation, stabilization, diagnostic capabilities, and transfer to a higher level of care. It may also provide surgery and critical-care services, as defined in the scope of services for trauma care. A trauma-trained nurse is immediately available, and physicians are available upon the patient's arrival in the Emergency Department. Transfer agreements exist with other trauma centers of higher levels, for use when conditions warrant a transfer.[9,12]

Level V

A Level V trauma center provides initial evaluation, stabilization, diagnostic capabilities, and transfer to a higher level of care. They may provide surgical and critical-care services, as defined in the service's scope of trauma care services. A trauma-trained nurse is immediately available, and physicians are available upon patient arrival in the emergency department.

1. Location

Irrua Specialist Teaching Hospital is located at KM 87, Benin -Auchi Road. Situated on the Ishan plateau, approximately 87 Kilometers north of Benin City, the hospital occupies a strategic position in a lush transition zone between the rainforest and the Guinea savanna ecological regions, enabling it to effectively serve rural and suburban communities in the area. The hospitals infrastructure includes 24/7 emergency unit accessible via a dedicated call line, specialized clinic and well - maintained wards noted for their cleanliness and organization, which contributes efficient patient care. The hospital has a capacity of 434 beds.

Strategic about Irrua Specialist Teaching Hospital is its location along the very busy Benin -Abuja express way, the only major highway linking the south to the north of Nigeria. It is the only tertiary center between UBTH in Benin City and FMC Lokoja in Kogi State, a distance of about 278 km.

The hospital is located next to the very busy University town of Ekpoma with a very heavy vehicular traffic coupled with its attendant traffic problems.

Figure 1 Entrance gate to ISTH Irrua

2. Capabilities

A level 1 trauma center should be able to provide 24/7 comprehensive care for every aspect of injury, from prevention to rehabilitation. It is also expected that being treated at a Level I trauma center can reduce mortality by 25% compared to a non-trauma center.[7] It has a full range of specialists and equipment available 24 hours a day[8]. The hospital over the years while still functioning in its old accident and emergency unit can provide uninterrupted 24 hours services everyday including weekends and public holidays. The number of trauma cases has increased over the years as shown in

Table 1. This included both adult and Paediatric cases. Since 2021 the mortality rate has remained less than 5%.

Table 1 Number of trauma cases and percentage mortality

Year	**Trauma cases (number)**	**Mortality (**Number)	**Mortality (**%)
2020	311	21	6.7
2021	340	15	4.4
2022	384	16	4.1
2023	511	23	4.5
2024	439	16	3.6

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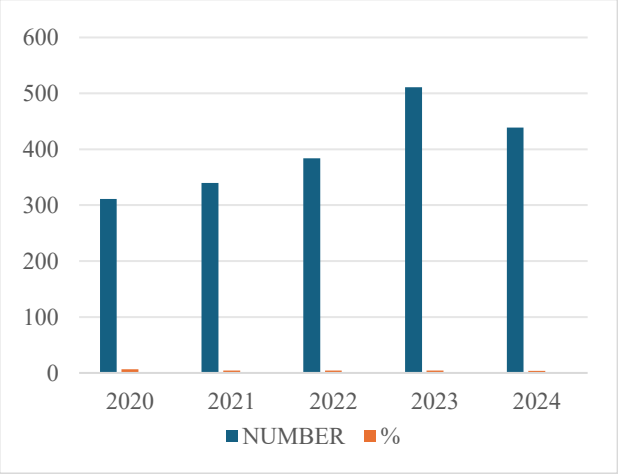

Fig 1: Bar chart showing number of cases and mortality

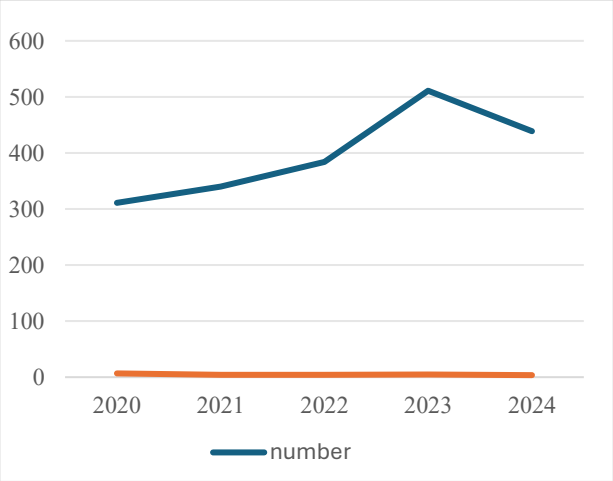

Fig 2: Line chart showing number of trauma cases and mortality

3. Building (Trauma Complex)

The hospital is currently investing in the building of an ultramodern state-of-the-art trauma/emergency centre which can compete with any trauma center in the whole of West Africa.

Pic 1 Trauma/Emergency Complex under construction

Pic 2 Aerial view when fully constructed

Pic 3 Front view of the Trauma/Emergency Complex when fully constructed

Pic 4 Front view of Children Emergency ward

The ultramodern trauma/emergency complex on completion with include

1. Triage area
2. Resuscitation area
3. Male and Female treatment areas
4. Two modern theatre-suites
5. Radiology facilities which include: A Digital X-rays
   B Two Ultrasound suites
   C Computed Tomography (CT) Scan room
6. Laboratory
7. Physiotherapy unit
8. Oxygen piping
9. Multiple consulting rooms
10. Consultants lounge and rest rooms
11. Pharmacy
12. VIP/Private apartments
13. Isolation ward
14. Seminar rooms
15. Fast track consultations 100 bed complex
16. Nursing stations and rooms and a couple of other provisions.

4. Staffing

Patients attending the highest levels of trauma centers should have access to specialist medical and nursing care, including emergency medicine, trauma surgery, oral and maxillofacial surgery, critical care, neurosurgery, orthopedic surgery, anesthesiology, and radiology, as well as a wide variety of highly specialized and sophisticated surgical and diagnostic equipment. A Level 1 trauma centre should therefore have specialized personnel in all these areas.

Irrua Specialist Teaching Hospital as teaching hospital has specialists and consultants in all the areas needed for efficient and result oriented running of a Level 1 trauma center ranging from neurosurgeons, cardio-thoracic surgeons, general trauma surgeons, orthopedic surgeons ,paediatric trauma surgeons and a host of other surgeons in other specialties.

5. Volume of trauma patients

The current accident and emergency unit in the hospital has been witnessing increasing number of trauma cases over the years (Table 1). This is expected to increases astronomically with the new complex under construction.

6. Research and Training

The West African College of Surgeons WACS in recognition of the need of expanding horizon of knowledge and skills needed for advanced trauma care and surgical critical care, initiated a Fellowship in Trauma and Surgical Critical Care to train surgeons with advanced knowledge and high level of skills in the management of trauma and critically ill surgical patients and to be in a position to provide leadership in care, teaching and research in trauma and surgical critical care. To date, the National Trauma Center has been accredited for this training.

Trainings at the complex will include

- Training of resident doctors in Surgery and other surgical specialties.
- Training of medical students on Trauma Postings
- Training of students on Industrial attachment
- Training of rescue organizations personnel in pre-hospital trauma life support, basic life support, advance cardiac life support, advanced trauma life support. Advanced paediatric life support and search and rescue programs. (Military, Police and Para-military Organizations)
- Observer ships for medical students
- Initiation, co-ordination and collaboration of research in trauma care management.
- Regular update and periodic review of trauma registry

7. Certification/Accreditation

The West African College of Surgeons (WACS) accredits trauma centres in Trauma and Surgical Critical Care in the West African subregion. Certified centers often feature dedicated trauma surgeons and multidisciplinary teams. In the United States the American College of Surgeons (ACS) provides the primary verification, ensuring 24-hour availability of trauma surgeons, specialists, and advanced imaging. Requirements include high patient volume, trauma research, education, as noted by National Institute of Health (NIH) quality improvement initiatives.

Clinical Significance

Research indicates that trauma management at a designated trauma center leads to better outcomes than care at a non-designated facility[13,14]. Receiving treatment at a designated trauma center significantly reduces mortality risk following traumatic injury.[15,16,17,18]

Conclusions

Trauma is a surgical emergency. It is an injury that most often has physical causes such as automobile accidents, assaults with sharp or blunt objects, entrapment, and blasts among others. To manage trauma effectively, there

must be a system in place a system that functions twenty-four-seven. As the practice of surgery began to rapidly develop, trauma management also had to evolve. Based on the type of services a center is able to provide, the ACS in conjunction with the American Trauma Society, classified trauma centers into five levels. Level I being the highest where comprehensive care is available and level V the lowest where basic care is available. Irrua Specialist Teaching Hospital Irrua is fast positioning itself to attain the Level 1 trauma centre and should be designated as such in no distant time. The personnel, location and the volume of the trauma patients already available in the hospital and the on-going projects should facilitate the commitment of the Federal Ministry in providing the remaining staff and equipment needed in designating ISTH, Irrua as a Level 1 trauma centre.

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