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Observed benefits of a major trauma centre in a tertiary hospital in Nigeria

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ABSTRACT

Introduction: A Trauma System or its components has been shown to improve trauma services and outcome of seriously injured patients. These organised services are non0existent or the components operate in isolation in most African countries.
This study was done to identify the observed advances in trauma care service delivery, brought about by the beginning of operation of a trauma centre in the capital city of a West African country.
Methodology: The operation of the trauma centre was reviewed for progress in terms of organisation of care, in-hospital care, training, and referral system and injury prevention. In addition, the challenges facing the trauma centre were also reviewed and discussed.
Results: The trauma centre has brought about better organisation of care and specialist availability, various training in trauma surgery, advances in referral and injury prevention. Funding is an identified threat to the function of the centre.
Discussion: The trauma centre provided the drive for specialist training in trauma and changes in the process of care. Funding is a threat to optimal function, as was poor inter-relatedness with other local hospitals, pre-hospital services and rescue providers.

African relevance

- Challenges of an isolated trauma center in subsaharan Africa
- Specialist training in Trauma through collaboration with an institution in South Africa
- Funding is threatening the function of the center
- Alternative low-cost training for injury management

Introduction

Establishment of organised trauma systems in developed countries has resulted in improvements; decreasing death rates for all treated trauma patients by 15–20% and especially lowering mortality from medically preventable cause by more than 50% [1,2]. Such systems entail a region wide planning process to optimise trauma care, which addresses planning for pre hospital care, hospital inspection and trauma services verification and relationships between hospitals at different levels of capability in the form of transfer protocols. Many of the systems have similar history, with reports of either poor services, or a single disaster, driving change of policy and system development [3].

Nigeria is situated in sub Saharan Africa; it is home to estimated 200 million people [4]. Despite having numerous natural resources more than half the countries population lives in poverty [5]. There is no system of Trauma care in the country. The present National health policy [6], plan to Integrate injury surveillance, detection, management and control into existing National Strategies and plans, Promote awareness of legislation and build capacity to respond to all forms of violence, establish trauma care centres at all levels of care, Build capacity of health systems in support of injury prevention and control, Develop mechanisms to ensure that the provisions of the National Health Act regarding emergency patients care are fully implemented and Establish a national emergency ambulance service.

In Africa, South Africa has made progresses in providing an accreditation system for trauma-capable hospitals by engaging all the role players in the development of the criteria, training of specialist trauma care providers and robust EMS services. The challenge is to expand this to other countries and to develop Afrocentric trauma systems that will be relevant to other countries, which are in varying stages of development.

This is a report of trauma centre, a single component of the trauma system in a tertiary hospital in the capital city of a sub-Saharan African country. It was established as an initiative of the hospital management

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and incremental hospital progress and sub specialisation. We review the function of the trauma centre for identified benefits after the centre began operation.

Method

Setting

National Hospital Abuja is a tertiary hospital with 500 beds located at the central area of Abuja, the federal capital of Nigeria.

Before the establishment of the trauma centre, trauma and non-trauma patients shared the same rooms in the emergency room, intensive care unit (ICU) and general wards. After the establishment of the trauma center, the trauma center had its own building, which is only used by trauma patients.

The trauma centre was established as a critical component of a Nigeria's healthcare delivery system, to provide resources and equipment to deliver the full range of specialist care needed by severely injured patients, and also maintain coordination with other facilities where the need for complementary expertise may be indicated.

The National Trauma Center is an 80-bed facility within the National Hospital, Abuja. All major injuries are resuscitated at the 8-bed resuscitation area, with facilities for intubation and ventilation and lifesaving procedures. There is a trauma team consisting of the consultant, trauma fellow, a senior registrar, surgical registrars, and trauma nurses on 24-hour cover for all major resuscitation and life-saving surgeries. It is mandatory for all the doctors taking trauma calls to maintain a current ATLS provider certification. There are 2 major theatres and an 8-bed burns unit with barrier nursing capacity. There is an 8 -bed intensive care unit (ICU) for critical trauma patients, which is managed by anesthesiologists. Full radiological services, including computerised tomography, as well as laboratory and blood transfusion services, are accessible 24 h per day. There are skills rooms and conference rooms for training and a helipad on the roof of the building.

Observed changes in trauma care services

Trauma teams and specialists' availability

The trauma centre located in a tertiary hospital in addition to dedicated trauma surgeons and their teams, had provided has complete specialist availability to participate n management of complex multisystem injuries.

The mass casualty bay is a free space for conversion to another Resusc, which had been utilised for increased surge capacity during disaster and mass casualty situations. The trauma centre had been the index hospital in management of 3 bomb blasts from terrorist activities and many mass casualty situations from road traffic incidents, fire out breaks and civil unrest.

Training

Post fellowship in trauma and surgical critical care

The centre provided the infrastructure for the establishment of the Post Fellowship in Trauma and surgical critical care by the West African College of Surgeons. It is a two-year full time program for surgeons in the trauma centre and a 6-month mandatory hands-on rotation at the trauma centre of Chris Hani Baragwanath Academic Hospital CHBAH in South Africa. The training in South Africa was deemed essential for experience in the working of an established trauma unit and its organisation, skills in damage control surgery and new entity procedures in trauma care. In addition, all fellows must participate at the Definitive Surgical Trauma Care course. The course focuses on life saving techniques and surgical decision making in management of major trauma. To date 2 general surgeons and 1 orthopedic surgeon has completed the program and 2 fellows are enrolled.

Advanced trauma life support ATLS

The National Postgraduate Medical College NPMCN and the American College of Surgeons (ACS) Nigerian chapter had made the skills floor of the trauma centre the venue for the regular ATLS and the trauma surgeons and fellows are instructors in the training. It is also envisaged that the training would be more widespread since the NPMCN made it a mandatory requirement before membership exams in all surgical specialties.

Prehospital trauma training

The World Bank sponsored training of trauma first responders of the Federal Road Safety Corps at the trauma centre. These are non-medics that usually provide ambulance service during the day for victims of Road Traffic Incidents. There are 135 providers trained in three programs to date.

Inter-hospital transfer

The trauma centre has a dedicated telephone line by which all referrals from other hospitals must be communicated, even though, there hadn't been a uniform agreed criteria and adherence in the referral process and no lead agency responsible for the inter hospital communication. This same requirement applies to the FRSC and police before presenting crash victims to inform beforehand. Research capability.

Trauma registry

In addition to the hospital records of patients, the trauma centre maintains a registry of all injured patients, that is updated daily.

The increased trauma patients load, in one roof had encouraged a lot of trauma care related dissertations and theses for residents in the hospital.

It is a mandatory requirement for all the Trauma fellows to publish a peer-reviewed trauma research article before the final exit examination.

Injury prevention, public education and advocacy

The annual Abuja Trauma Conference bring together stake holders in trauma in and around the capital city to present papers, discuss pertinent trauma issues and improve networking for all trauma service related activities.

Individual victims and families in the follow-up clinic usually have a health education and injury prevention lecture delivered by the nurses; even though the nurses had no formal training in injury prevention and practice.

Discussion

Trauma care is a multidisciplinary enterprise, and is critical to providing a comprehensive response to injury. The trauma centre being in tertiary hospital has capability for comprehensive trauma care and input from a range of specialty services (such as radiology, orthopedics and neurosurgery, cardiothoracic and critical care). This is similar to the operation of level I trauma centers [8] and presence of spectrum of specialists affect the timeliness and availability of these advanced specialty services.

The management protocol, which was adapted from the trauma unit of Chris Hani Baragwanath Academic Hospital provide guidance for a systematic approach to injury, improving early recognition of clinical needs and ensuring appropriate management. It contained details for triage, assessment, management, and care coordination.

The rudimentary referral system between the centre and other hospitals ensures that injured patients receive continuous care that is matched to their clinical needs. These concentration and better organisation of the services ensures better care for the patients [9].

The everyday emergency care service had been prepared to respond

to extraordinary events to ensure uninterrupted delivery of services in the face of increased demand. The hospital's Emergency Operation Plan (EOP) was drafted through the support of Organization for the Prohibition of Chemical Weapons and its Hospital Preparedness Course for Chemical Incidents (HOSPREP) [10]. This is to develop an organised process to initiate, manage and recover from variety of emergencies both external and internal, which would confront the hospital and surrounding communities. This would hopefully be achieved through incremental change, to an agreeable maturity.

A substantial number of conditions and therapeutic modalities in trauma surgery require highly specialised knowledge and training in order to achieve satisfactory patient outcomes. Training and certification in the sub-specialty discipline of Trauma Surgery addresses this need.

In recognition of lack of specialists surgeons to provide these services in Nigeria and West African sub region, the West African College of Surgeons WACS initiated and accredited the Trauma centre for a 2-year Post 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. This included a mandatory, hands-on 6-month rotation at the trauma centre of Chris Hani Baragwanath Academic Hospital in South Africa for all the Fellows before completion. This is fashioned from the subspecialty certificate in trauma surgery of the College of Surgeons of South Africa [7].

The training in South Africa had provided the opportunity for all the fellows to participate in the Definitive Surgical Trauma Care course DSTC [11]. This modular course for surgeons was pioneered in South Africa (1999) and has become a worldwide respected training initiative. It's a 3-day course with short didactic lectures, extensive operative discussions, and operative exercises on live anesthetised animals and human cadaver sessions. It is aimed at teaching strategic thinking and decision-making in the management of severely injured patients and provision of practical surgical skills to manage major organ injuries. The course is parallel to the Advanced Trauma Operative Management ATOM and Advanced Surgical Skills for Exposure in Trauma ASSET courses of the American College of Surgeons-Committee On Trauma ACS-COT [12].

The Advanced Trauma Life Support Course ATLS [13] course of the American College of Surgeons has had dramatic effect in improving outcome of patients by standardising their resuscitation and initial assessment, and providing one safe simple way for the initial care of such patients.

The National Postgraduate Medical College NPMCN and the American College of Surgeons (ACS) Nigerian chapter had made the skills floor of the trauma centre the venue for the regular ATLS and the trauma surgeons and fellows are instructors in the training. It is also envisaged that the training would be more widespread since the NPMCN made it a mandatory requirement before membership exams in all surgical specialties.

This course had been adopted in South Africa for more than three decades and a substantial reduction in mortality among the most severely injured from 67% to 34% was reported in Trinidad after most doctors staffing the casualty ward at the main trauma hospital had been ATLS certified [14].

All the states in Nigeria including its capital city have no formal Emergency Medical Service EMS or prehospital trauma care. These systems are essential to ensure timely access to emergency care, especially for severely injured patients. The training of members of the Federal Road Safety Corps personnel in care of crash victims is similar to other reports in Africa describing innovative lay provider initiatives that could lead to improved mortality and other positive impacts [15].

The trauma registry is designed to capture patient demographics, along with diagnoses, investigations, and dispositions. In addition the location and mechanism of injuries, along with subsequent patient outcomes are also captured. This is important in developing a strong trauma care system, as this information can focus efforts on parts of the system in greatest need of improvement.

The absence of accurate data regarding injury has been identified as a major shortcoming in many African countries and this makes it difficult to make evidence-based policy and planning decisions, monitor trends as well as monitoring and evaluation of intervention programmes [16].

The South African National Injury Mortality Surveillance System (NIMSS) [17] and injury surveillance system of Uganda are examples of the benefits of developing sound injury measurement systems. These systems established and implemented African context-specific "best-practices" for the prevention of injury and can be of use in the various African states.

The trauma centre staff play a significant role in injury prevention by providing information about the human and financial burden of traumatic injuries for prevention workers, advocacy to stakeholders and lawmakers and direct involvement in patient education and program development.

This is achieved through the Annual Abuja Trauma Conference and during individual patient interaction.

Training, Educating and Advancing Collaboration in Health on Violence and Injury Prevention TEACH-VIP [18] is a comprehensive training by the WHO that identify the basic principles of injury prevention, control and safety promotion by diagnosing problems from a multi displinary perspective and how to design, implement and evaluate injury prevention and safety promotion interventions. This training could be used to bridge the knowledge and skills gap in providing violence and injury prevention services by the providers in the centre. With the beginning of operation of the trauma centre, certain problems became manifest. These are detailed below.

Funding

There is no clear mechanism of funding the services at the trauma centre. Most of the victims are uninsured and expected to pay out of pocket for their care. In addition the centre receives a lot indigent and unknown patients; mostly brought-in by police or rescue operatives to the National Trauma Center with severe injuries, often unconscious from unspecified road traffic accidents. Management of these patients had been a particular financial challenge to the trauma centre; because there is no social insurance in the country, the hospital has to bear their cost of care from revenue generated from other parts of the hospital, without any mechanism for reimbursement. In addition other services with dependencies on relatives like blood donation, purchase of out-of stock consumables and drugs and then follow the challenges of trying to identify patients and locate their family.

Rehabilitation services

There are no rehabilitation facilities in the country and these services are provided in continuum with the initial admission, thereby prolonging hospital length of stay.

Conclusion

In conclusion, the trauma centre had provided the drive for specialist training in trauma and changes in the process of care. Funding, however is a threat to optimal function of the centre and so also, poor interrelatedness with other local hospitals and EMS and rescue providers, as obtained in an organised trauma system. Our recommendations are:

1. Further studies of rigorous design are recommended to establish clearly the impact of the trauma centre on mortality and morbidity on patients treated with injuries.
2. Advocacy for a statewide trauma system to integrate hospitals, rescue providers and prevention services to prevent overwhelming

the centre and better referral mechanism with clear mechanism of funding, are also recommended.

Dissemination of results

The article would be presented at the hospital grand round, trauma centre seminar and as an abstract in the All Fellows Congress of the National Postgraduate Medical College of Nigeria.

Author contribution

Authors contributed as follows to the conception, design of the work; acquisition, analysis and interpretation of data for the work; and drafting the work or revising it critically for important intellectual content. UAG contributed 70%; GOO and OO 15% each. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflicts of interest.

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