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Missile injuries in children an experience in state specialist hospital Maiduguri north eastern Nigeria

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Abstract
Background: In armed conflicts, women and children fall victims. This is more devastating in suicide bombings; Rockets propelled grenade attacks as seen during insurgency in north eastern Nigeria.
Patients and methods: The study reviewed all missile injury patients managed at Specialist Hospital in 2 years aged 16 years and below.
Results: A total of 182 patients aged 3 months to 16 years with a mean of 11.56 years, and male to female ratio of 3.144: 1. There were 110 blast victims and 72 gunshot patients. The injury sites were extremity fractures 99 and soft tissue 149. The procedures done were wound debridement in all patients, laparotomy in 63.64% of abdominal injuries, and chest tube drainage in 57.89% of chest injuries. Post operative complications were surgical site infection in 6.04%, and renal failure in 2.75%. Mortality was 7.14%.
Conclusion: Missile injury is being seen with increasing terrorism.

Keywords: Missile injuries, Children, Management outcome, Developing country

Introduction
Terrorism, insurgency, civil conflicts, and conventional warfare are characterized by deployment of high caliber weapons of mass destructions [1]. Globally terrorism is on the increase due to poverty, poor governance, and easy accesses to small arms in open market [2] as fallout following the fall of Iraq, Libya, Afghanistan, and of recent the conflict in Syria [3, 4]. These strongly encouraged the rise of AL-Shabab, ISIS, Daesh, and Boko Haram in Somalia, Iraq, Yemen, and North Eastern Nigeria respectively [5, 6] fighting legitimate governments and civil society in these regions. In such conflicts rocket propelled grenade (RPG), improvised explosive devices (IEDs), road side bombs, and suicide bombings are deployed. High population density areas like markets, schools, bus stations, cinema, and airports are targeted with devastating consequences [7, 8]. High fatality and mass casualty are the hallmark of such attacks. Pre-hospital [9] care and multidisciplinary [10] hospital management are essential for victim survival. This study reviewed our experience in management of missile injury in children.

Patients and Methods
The study reviewed all missile injury patients managed at State Specialist Hospital between January 2014 to December 2015 aged 16 years and below. Permission was granted by the Hospital management and consent obtained from patients parent. Information was extracted from clinical and laboratory records and data analyzed using SPSS version 16. Patients were resuscitated using intravenous fluid, antibiotics (ceftriaxone and metronidazole), tetanus toxoid, and blood where necessary. The following investigations were carried out, full blood count blood chemistry, hemoglobin genotype, chest and bone radiographs, and abdominopelvic ultrasound scan. Others were CT scan and MRI where indicated. Patients were managed by multidisciplinary trauma team. Operative procedures were done under general anesthesia. Post operative rehabilitation such as prosthesis, psychotherapy, educational support by the government was given.

Results
A total of 182 patients were studied age ranged from 3 months to 16 years with a mean of 11.56 years table 1 and male to female ratio of 3.144: 1. There were 110 blast victims

(88males and 22 females) and 72 gunshot patients (50 males and 22 females). The injury sites were extremity fractures 99 and soft tissue 149 table 2(A&B). The procedures done were wound debridement in all patients, fixation of fractures, laparotomy in 21(63.64%) of abdominal injuries in which mesenteric tear in 13(61.90%), bowel injury in 11(52.38%), liver laceration 4(19.05%), bladder in 9(42.86%) stomach in 3(14.29%) and kidney in 2(9.52%) were repaired, and splenectomy in 5(23.81%) done. chest tube drainage in 11(57.89%) of chest injuries, refashioning of traumatic amputation stump in all 4 patients. The post operative complications were surgical site infection in 11(6.04%), renal failure in 5(2.75%), post operative pneumonia in 4(2.20%), and burst abdomen in 3(1.65%). The overall mortality recorded was 13(7.14%), with 9 (8.18%) from blast injury and 4 (5.56%) from gunshot.

Discussion

Children are one of the vulnerable groups affected in terror attacks especially in developing countries where child labor, street kids out of school children that are running errands, engaged in menial jobs to earn a living are a common site. This study found male children are mostly affected 75.82% overall, and 69.44% and 80%, in gunshot and blast injuries respectively. This is comparable to the findings by Peleg *et al* [11] that reported male preponderance of 71% overall, and 84% in gunshot and 63% in blast. The commonly affected sites in children following a blast injury are the extremities followed by the trunk [12]. The current study found similar trend with lower limb, upper limb, and abdomen in that order most likely due to explosives being hidden in the ground. Most fatality occurred at the scene of the accident making pre hospital care imperative [13] which is lacking in most of developing countries due to poor healthcare system. Such Prehospital care will addressed volume depletion and cardiopulmonary insufficiency thereby improving survival. Terror attacks usually occur in remote areas or at odd times. Occasionally terrorists deliberately blow up telecommunication facilities before launching attacks as experienced during several Boko Haram attacks. In similar attacks medical corp and transport convoys fell victims. Victims should reach hospital within shortest possible time to be received by multidisciplinary trauma team [14]. This will ensure adequate resuscitation and definitive treatment with intensive care services as global best practice dictates. The mortality rate of 7.14% is comparable to the open air explosion mortality found by Leibovici [15] *et al* of 7.8%. In conclusion missile injuries in children are on the increase especially in developing countries where children engaged in menial jobs, street begging who are usually caught in the conflicts. Insurgency has taken more than a decade in North eastern Nigeria with devastating effect in the socioeconomic condition of the people.

Table 1: Age distribution

Age (yrs)	No	%
<5	33	18.13
5 – 9	48	26.37
10 – 14	80	43.96
15+	21	11.54
Total	182	100.00

Table 2A: Gunshot sites

Sites	No	%
Extremities: Upper limbs fractures	14	19.44
Lower limbs,	21	29.17
Chest	08	11.11
Abdomen	14	19.44
Head and Neck	06	08.33
Pelvis and Perineum	07	09.72
Soft tissues	43	59.72

Table 2B: Sites of Blast injuries

Sites injured	No	%
Extremities: Upper limb fractures	18	16.36
Lower Limb,,	38	34.55
Traumatic Amp. UL	2	01.82
,, ,, LL	2	01.82
Chest	11	10.00
Abdomen	19	17.27
Head and Neck	6	05.45
Pelvis and Perineum	16	14.55
Soft Tissue	56	50.91
Burns	21	19.10

NB: UL = Upper Limb
LL = Lower Limb
Amp = Amputation

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