



Original article

## Combat injuries sustained by troops on counter terrorism and counter-insurgency operations in North east Nigeria: Implications for intervention

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### ABSTRACT

**Background:** Understanding the epidemiology of battlefield casualties is required for plans and coordinated efforts towards improved combat trauma care (CTC) performance and outcome. The engagement of the Armed Forces of Nigeria (AFN) in containing Boko Haram Terrorism (BHT) and insurgency in Northeast Nigeria has increased the risk of combat injuries to the troops. This study determined the characteristics of combat injuries sustained by soldiers on counter terrorism and counter-insurgency operations to contain BHT.

**Methods:** A retrospective cross-sectional study of combat casualties managed in 7 Division (Field) Hospital, [an equivalent of UN Level 2 facility] Maiduguri, Northeast Nigeria between November 2013 and October 2014. Using data obtained from a designed Operational Casualty Card that contains their sociodemographic characteristics, categorization (as Combat Arm, Combat Support Service, Civ-JTF), nature, mechanism and sites of injury as well as inpatients records. The data were collated and analysed using SPSS version 20.

**Results:** A total of 209 casualties were treated. The age of the casualties ranged from 18 to 57 years with a mean of  $30.6 \pm 7.7$  years and males constituting 99%. Over two-third (71.3%) casualties had gunshot injuries while 14.3% and 8.1% sustained improvised explosive device (IED) and fragments injuries respectively. Over three-quarter (77.5%) sustained injuries on the upper and lower extremities while 17 (7.7%) and 12 (5.7%) had injuries on thorax/abdomen and head/neck respectively. Nineteen (9.1%) casualties resulted from friendly forces/colleagues.

**Conclusion:** The study revealed that gunshot and IED/blasts on the extremities were the most frequent mechanism and pattern of injuries sustained with less than a tenth of the casualties resulting from friendly forces. Training health personnel on CTC, deployment of combat lifesavers to improve pre-hospital CTC, employment of skilled Orthopaedic Surgeon and other relevant surgical subspecialties and timely air evacuation of critical cases from the Field Hospital to the Base Hospital are recommended.

### African relevance

- The upsurge of Boko Haram terrorism has adversely affected the security of lives and property in Nigeria, Chad, Niger and Cameroun.
- Boko Haram's collaboration with other terror groups such as the Islamic State of West African Province in other African countries is of great concern to the African Union.
- The establishment of a Multinational Joint Task Force by five African countries (Nigeria, Chad, Cameroun, Niger and Republic of Benin) is to contain Boko Haram terrorism.
- The increasing number of internally displaced persons and refugee camps in African caused by Boko Haram terrorism is worrisome.
- There is a profound effect of Boko Haram terrorism on healthcare delivery and food security in Africa.

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## Introduction

Since the dawn of history, nations have fought against each other in their quest for sovereignty, economic interests, political influence and to combat terrorism. The diversity and complexity of wars and casualties have continued to agitate the minds of military health experts, researchers and logisticians. From the Napoleonic wars, through the First and Second World Wars to the ones against terrorism, the nature of injuries reported, and dynamics of casualty management have undergone significant transformations. Fatal injuries such as penetrating head trauma (13%), surgical uncorrectable torso trauma (25%), correctable surgical trauma (10%) and severe bleeding from extreme wounds (9%), mutilating blast trauma (7%), tension pneumothorax (5%) and airway problems (1%) are the most documented [1,2]. Also, the high energy and lethality of the wounding agents, multiple causes of wounds and preponderance of penetrating injuries have posed serious challenge to effective Combat Casualty Care (CCC). This is more pronounced in human health resource-limited and logistics-constrained settings where definitive care is significantly delayed [3]. Thus, understanding the nature of combat-related injuries will assist in strengthening CCC through effective deployment of relevant critical healthcare experts and equipment, provision of sufficient medical logistics and focused training on all aspects of combat trauma care.

Nigeria is the most populous country in Africa. With an estimated population of over 190 million, Nigeria accounts for about 15.7% of Africa's human population. The country's health indices are amongst the worst worldwide with communicable diseases (HIV, tuberculosis and malaria), Maternal and Child Health and Vaccine Preventable Diseases as contributors of morbidity and mortality [4]. In addition, Nigeria still grapples with public health emergencies (cerebrospinal meningitis, viral haemorrhagic fevers, cholera) and disasters [5]. Also, within the last decade, contemporary diverse and complex security challenges such as insurgency, ethno-religious conflicts, banditry, kidnapping and Boko Haram Terrorism (BHT) have increased consequences on the doctrine, posture and activities of security agencies [6,7]. The Boko Haram Terrorists (BHTs) have become increasingly aggressive with seizure of large areas in Northeast Nigeria [6–8], thus posing serious threats to the country's sovereignty. The BHT (which has been ranked as the world's deadliest terror group by the Global Terrorism Index) has resulted in killing of over 10,849 people in Northeast Nigeria and displaced about 2.3 million from their homes [8–10]. The country's ill-defined international borders fostered high risk for infiltration by foreign nationals and spread of BHT to neighbouring Cameroon, Chad, and Niger; thus threatening regional socioeconomic and human activities [11].

To contain the devastating effects of BHT threats on human and the nation's economy, the President ordered the Armed Forces of Nigeria to defend the Country against Boko Haram terrorism, maintain the country's territorial integrity, secure its borders and suppress other insurrections in line with the Nation's constitution [12]. In response to the directive, the Nigerian military leadership deployed more troops to dislodge the insurgents in Northeast Nigeria; the epicentre of Boko Haram terrorists. To meet the required manpower for the operation, some combat service support personnel were retrained and assigned to combat arm duties. To facilitate the ousting of Boko Haram terrorists in the very difficult terrain and topography they occupied, a local militia group called "Civilian Joint Task Force" (Civ-JTF) was also co-opted to support the Armed Forces [13]. In addition, troops were widely deployed to cover rural, semi-urban and urban settings to counter the guerrilla attacks by the Boko Haram Terrorists (BHTs). Codenamed *Operation Lafiya Dole* (meaning *Peace Enforcement*), this counter terrorism and counter-insurgency operation to eliminate BHTs has increased the risk of combat injuries to both troops and the Civ-JTF, with a heavy toll on medical logistics and human health resources. However, the lack of data on epidemiology of combat injuries sustained by Nigerian troops hamper effective operational plans and decision-making. Thus, this study aimed at determining the epidemiology of

combat injuries sustained by troops deployed for *Operation Lafiya Dole* to enable planning and implementation of appropriate interventions including treatment, medical equipment and logistics supplies (including drugs), deployment of critical medical experts and identifying training needs especially on CCC.

## Methods

This retrospective cross-sectional study was conducted at 7 Division Hospital (equivalent to UN Level 2 facility) between November 2013 and October 2014. Located in Maiduguri, Northeast Nigeria, the hospital had a 200-bed capacity and provided medical, surgical and dental care services for both civilians and military personnel. It was also a designated Field Hospital and referral centre for 2 Field Ambulances [Fld Ambs] and 8 Regimental Aid Posts [RAPs]; equivalents of UN Level 1+ and UN Level 1 facilities respectively that provided medical support for *Operation Lafiya Dole*. Conventionally, the RAPs and Fld Ambs support battalions and Brigades respectively during combat operations. A total of 25,343 patients were treated within the period of this study. In spite of its enormous task of providing CCC in addition to other healthcare services, the Hospital lacked sufficient skilled human health resource. The available manpower included 1 Consultant General Surgeon (who was also the Hospital's Commander), 1 Plastic Surgeon, 1 Family Physician, 1 uniformed Medical Officer, 5 Nurses, 2 Laboratory Scientists, 3 Medical Record Officers and one each of Pharmacist, Physiotherapist and Mortician [14]. To bridge the manpower gap and ease the burden of patient management, one each of Orthopaedic/Trauma Surgeon, Physician, Ophthalmologist, Orthorhinolaryngologist and Psychologist were employed as locum staff. In line with the Nigerian Armed Force's CCC pathway, injured soldiers are evacuated from the point of injury to the RAP and Fld Amb for first-line treatment before further evacuation to the Field Hospital. In *Operation Lafiya Dole*, the average time interval of casualty evacuation by road from the nearest RAP and furthest RAP to the Field Hospital was 2 h and 6 h respectively. However, depending on the severity of injury and close proximity, some casualties bypassed the Fld Amb and were evacuated directly to the Field Hospital. Thus, all combat casualties from battlefield were managed at the Field Hospital. Once stabilized (usually within 3–10 days), cases requiring further definitive care were evacuated by air to the Base Hospital (an equivalent of UN Level 3 facility) in Kaduna; a distance of about 700 km from the Field Hospital. The frequency of casualty evacuation from the Field Hospital to the Base Hospital depended on availability of airlift. Due to unavailability of a mortuary (during the period of this study), the bodies of troops killed-in-action (KIA) were directly evacuated to a morgue in a civil hospital. Autopsies were not performed on the KIA to ascertain the nature of injuries sustained.

A designed Operational Casualty Card (OPC) and inpatient records were used to obtain data of casualties managed in the hospital within the period of study. The inclusion criteria were troops and Civ-JTF on *Operation Lafiya Dole* who sustained combat injuries and brought alive to the Hospital. The KIAs were excluded from the study due to absence of autopsies to assess their nature of injuries. Adapted from the United States Combat Casualty Care (CCC) card, the OPC contains the casualty's biodata, categorization (as Combat Arm personnel, Combat Support Service personnel, Civ-JTF), nature, mechanism and site of injury, state of consciousness on arrival (using Glasgow Coma Scale) and triage category. The management outcome was obtained from inpatient records. The Nigeria Ministry of Defence Health Research Ethics Committee (MODHREC) reviewed and granted ethical approval for this study. The results were collated and analysed using SPSS version 20. Chi square statistic was used at 95% level of significance.

## Results

A total of 209 casualties were managed for combat injuries at 7 Division (Field) Hospital during the period under review. The age of the

casualties ranged from 18 to 57 years with a mean of  $30.6 \pm 7.7$  years. One hundred and seventy-five casualties (83.7%) were in the age group of 21–40 years while 207 (99.1%) were males. Regarding the rank category, slightly over three-quarter of the casualties (76.1%) were Junior Non-Commissioned Officers (JNCO) while 15 (7.2%) were Civ-JTF as shown in Table 1. With respect to the sources of injury, 183 (87.9%) casualties were due to enemy fire, 19 (9.1%) from friendly fire while 2.9% was self-inflicted as shown in Fig. 1.

Fig. 2 showed that out of the 157 Pte-Cpl, about two-third (66.2%) were deployed in urban and semi-urban areas with a complement of 9 (60%) of the Civ-JTF.

Over two-third (71.3%) soldiers sustained gunshot injuries, followed by injuries due to Improvised explosive Device [IED/blasts] (14.3%) and fragments (8.1%) as shown in Table 2.

Table 3 showed that 55.1% of the combat arms (Infantry, Armour and Artillery) compared with 24 (11.5%) combat support service personnel sustained gunshot injuries. Blast-related (wounds from IEDs/blasts, landmines, other blast phenomena) and fragment injuries accounted for 9% and 5.7% of casualty burden respectively among personnel of the Combat arms.

Fig. 3 showed that slightly above three-quarter (77.5%) sustained injuries on the upper and lower extremities compared with 16 (7.7%) and 12 (5.7%) that had injuries on thorax/abdomen and head/neck respectively (p value < 0.001). Nineteen (9.1%) had injuries at multiple sites.

Seventy-nine (37.8%) casualties were hospitalized for 10 days while 130 (62.2%) of them were managed in the hospital for over 20 days. It should be noted that 6 (0.3%) of the wounded died within the first three days of their hospitalization as shown in Table 4.

Out of the 127 casualties referred to the Base Hospital, 51 (40.2%) were evacuated within the first 10 days of admission while the rest (58.9%) were evacuated within 11 to 50 days.

## Discussion

The engagement of Nigerian troops in Operation Lafiya Dole in Northeast Nigeria has had a significant toll on the Armed Forces health services, medical logistics and human health resource. The lack of data on epidemiology of combat injuries sustained by Nigerian troops has hampered effective operational plans and decision-making. This study determined the pattern of combat injuries sustained by soldiers on Operation Lafiya Dole with a view to planning and implementing appropriate interventions to improve CCC and address health manpower, medical equipment and logistics challenges.

Bearing in mind the asymmetric nature of this operation coupled with its increased risk and vulnerability to combat injuries, about 99% of the deployed troops were males and this reflected the pattern of casualties. This male dominant casualty prevalence corroborates studies by

**Table 1**  
Demographic characteristics of casualties of Operation Lafiya Dole: N = 209.

Characteristics	Frequency (n)	Percent (%)
<20 years old	5	2.3
21–30 years old	116	55.5
31–40 years old	59	28.2
41–50 years old	23	11.0
>50 years old	4	1.9
Male	207	99.0
Female	2	1.0
Rank		
Pte-Cpl (JNCO)	157	75.1
Sgt-MWO (SNCO)	13	6.2
2Lt-Capt (JCO)	17	8.1
≥ Major (SCO)	5	2.4
Civilian JTF	15	7.2

Pte, Private; Cpl, Corporal; Sgt, Sergeant; MWO, Master Warrant Officer; 2Lt, Second Lieutenant; Capt, Captain.

Aras M et al. where the male: female casualty ratio was 152:18 and Chaiprom et al. where all the casualties were males [15,16]. Similarly, Jawas et al.'s findings on the management of war-related vascular injuries reported that 89% were males [17]. Understanding that the military profession is male-dominated coupled with the high propensity of Boko Haram terrorists to abduct women and children could justify the reason for the male-dominant deployment in this operation [18,19]. Suffice to state that due to the nature and intensity of Operation Lafiya Dole, the deployment of female soldiers was restricted to Division Headquarters.

The age range of casualties in this study was 18 to 57 years with a mean standard deviation of  $30.6 \pm 7.7$  years and 84.7% were within the age category of 21–40 years. Similarities in mean age of casualty were documented in Malik et al. and Razak et al.'s studies that reported the mean age of 26.6 and 29.4 years respectively [20,21]. The higher casualty burden among this age category could be attributed to their high risk-taking ethos, feeling of invulnerability and infrequent use of body armour (flak jacket, ballistic helmet) and other protective equipment.

The Nigerian Army is functionally organized into combat arms, which are Infantry and Armour; the combat support arms, which are Artillery, Engineers, and Signals; Combat Service Support which are Supply and Transport, Medical, Ordnance and the Electrical and Mechanical Engineers among others [22]. To meet the required manpower for the operation, some combat service support personnel were retrained and assigned to combat arm duties. Soldiers within the rank category of Private to Corporal (Pte-Cpl) are the majority in any fighting unit and they are usually at the frontline. That explains why in this study, 157 (75.1%) casualties were within the rank category of Pte-Cpl and this corroborates report by Nese et al. on the casualties in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), where more soldiers of junior rank were wounded compared to senior rank and officers [1,3,23]. In another study that reviewed the combat wounds in Iraq and Afghanistan from 2001–2009, the casualty cohort was predominantly males (98.8%) and 59% of them were junior enlisted [24]. The low prevalence of combat injuries among the junior enlisted in the latter study could be attributed to intensity of pre-deployment training and effective use of body armour.

With respect to the mechanism of injuries in this study, gunshot wounds accounted for over two-third (71.3%) of all combat casualties while improvised explosive device (IED)/blasts accounted for 14.3%. Others were fragments such as ricochets (8.1%), burns 4.3% and blunt/crush injuries (2.4%). This finding is at variance with the report of a systemic review of prevalence and characteristics of battle casualties from NATO coalition forces in Iraq and Afghanistan where gunshot wounds and IED/blasts accounted for 18% and 72% respectively [2]. In other studies, too, blast-related injuries also predominated with wounds from IEDs, landmines, shrapnel and other blast phenomena ranging from 74.4% to 97% [1]. Suffice to mention that Operation Lafiya Dole is essentially an offensive-defensive counterinsurgency operation (attacking, capturing and holding the captured ground) and protection force that deploys relatively mobile troops on combat patrols. The deployment of IED and Mine-clearing vehicles makes troops less susceptible to laid IEDs and landmines on routes of patrol. The more frequent troops' engagements in close quarter battles put them more at risk of gunshot injuries than IEDs. Bearing in mind the importance of body armour in eliminating or reducing severity of blasts and penetrating injuries, soldiers were provided flak jackets and other personal protective equipment (PPE). However, there is a need to continuously sensitize the troops on the use of body armour during combat.

In determining the casualty burden according to Corps, this study showed that overall, 158 (75.6%) of the casualties were of the Combat/ Combat Support Arms (Infantry, Armour and Artillery). With respect to mechanisms of injury, 115 (55.1%) of the combat arms (Infantry, Armour and Artillery) compared with 24 (11.5%) combat support service personnel sustained gunshot wounds. Blast-related (wounds from IEDs/blasts, landmines, other blast phenomena) and fragments injuries

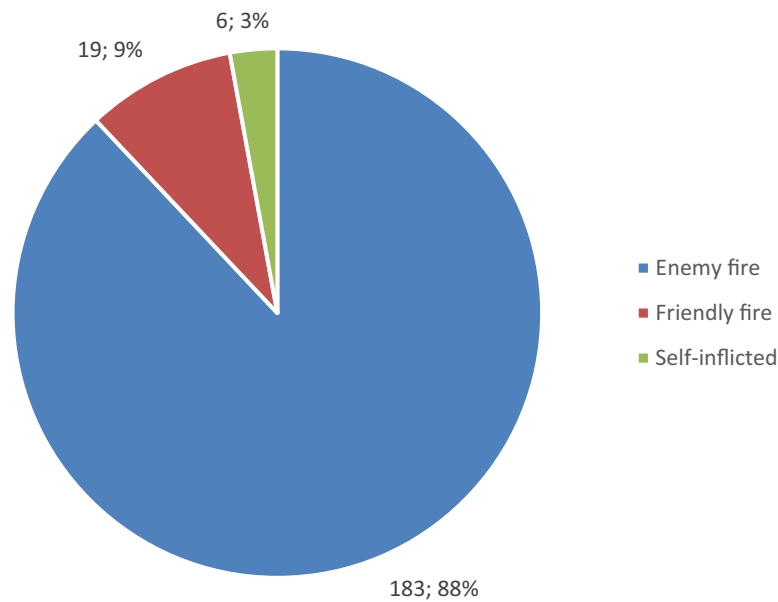


Fig. 1. Sources of injuries sustained by troops of Operation Lafiya Dole (N = 208).

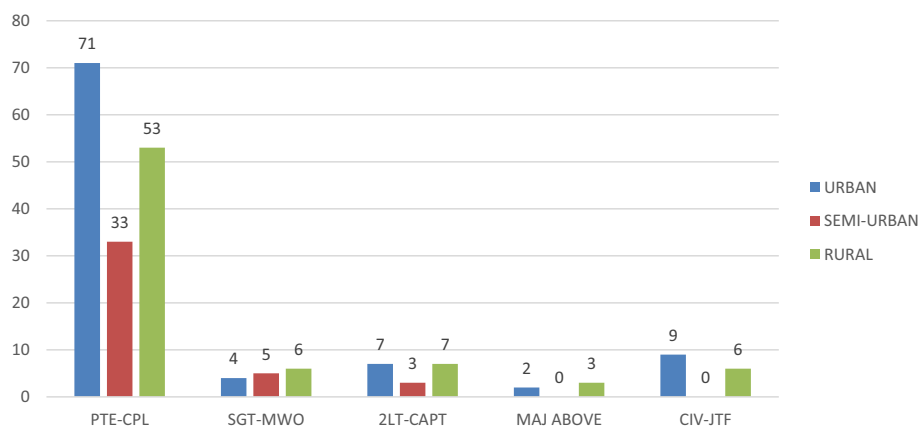


Fig. 2. Summary of casualties based on rank and deployment at Operation Lafiya Dole.

Pte, Private; Cpl, Corporal; Sgt, Sergeant; MWO, Master Warrant Officer; 2Lt, Second Lieutenant; Capt, Captain.

**Table 2**  
Nature of injuries sustained in relation to deployment of troops on Operation Lafiya Dole.

Type of injury	Troops deployment n (%)			Total
	Urban	Semi-urban	Rural	
Gunshot	68 (45.6)	26 (18.1)	54 (36.3)	148 (71.3)
Fragments	11 (64.7)	3 (17.6)	3 (17.6)	17 (8.1)
IED/blast	9 (32.1)	8 (28.6)	13 (39.7)	30 (14.3)
Blunt crush	1 (20.0)	2 (40.0)	2 (40.0)	5 (2.4)
Burn	4 (38.7)	2 (25.0)	3 (37.5)	9 (4.3)
Total	93	41	75	209

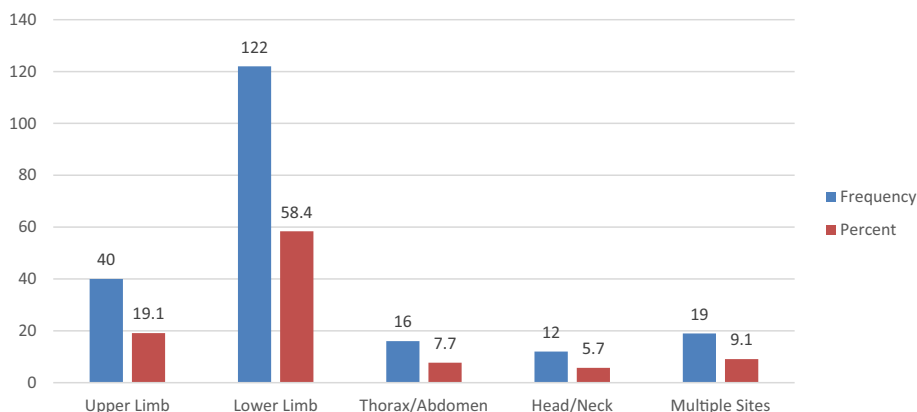
accounted for 9% and 5.7% of casualty burden respectively among personnel of the combat arm. Overall, 158 (75.6%) of the casualties are soldiers of the Combat Arms. Thus, this finding (as reported in another study) has revealed that components of service, rank, gender are three significant factors that increase risk to combat injuries and ensued deaths [23]. It is worthy to mention that the combat/combat support arms are at higher risk of becoming casualties because of their tasks of attacking, capturing and holding the captured ground. In the course of

movements and dominating the captured ground, the combat arms are more vulnerable to ambushes, gunshots and blast-related injuries like IEDs, landmines and shrapnel.

Regarding the wounding pattern in this study, over three-quarter (77.5%) sustained injuries on the upper and lower extremities, thorax/abdomen (7.7%), head/neck (5.7%) and injuries at multiple sites (9.1%). These findings contrast Belmont et al.'s study where the distributions of the combat wounds were relatively lower in the extremities (51.9%) and higher in the head/neck (28.1%) and thorax/abdomen (20%) [24]. Worthy of mention is the fact that soldiers in this operation were provided flak jackets, ballistic helmets and other personal protective equipment (body armour) and its use was enforced. This could have accounted for the high injuries sustained on the extremities with low injuries on the torso, thorax/abdomen and head/neck. The predominant injuries on the extremities reiterate the dire need to have highly skilled Orthopaedic/trauma Surgeon at the Field Hospital. Also, permanently engaging other relevant surgical specialists such Cardiothoracic, Neurosurgeon, Ophthalmologist, Orthorhinolaringologist, Plastic Surgeon etc.) for the Base Hospital by the military leadership is highly recommended to improve combat casualty care performance and outcome.

**Table 3**  
Mechanisms of injuries sustained by troops on *Operation Lafiya Dole*.

Mechanisms of injuries	Frequency (%)					Total
	Infantry	Armour	Artillery	Support services	Civilian JTF	
Gunshot	57 (27.3)	52 (24.9)	6 (2.9)	24 (11.5)	9 (4.3)	148 (70.8)
Fragments	9 (4.3)	2 (0.9)	1 (0.5)	4 (1.9)	1 (0.5)	17 (8.1)
IED/blasts	7 (3.3)	8 (3.8)	4 (1.9)	8 (3.8)	3 (1.4)	30 (14.4)
Blunt crush	2 (0.9)	1 (0.5)	2 (0.9)	–	–	5 (2.3)
Burns	4 (1.9)	1 (0.5)	2 (0.9)	1 (0.5)	1 (0.5)	9 (4.3)
Total	79 (37.7)	64 (30.6)	15 (7.2)	37(17.7)	15 (7.2)	209 (100)



**Fig. 3.** Anatomic categorization of injuries sustained by troops of *Operation Lafiya Dole*.

**Table 4**  
Hospitalization and referral of casualties of *Operation Lafiya Dole*.

No. of days hospitalized	No. of patients hospitalized n (%)	No. of patients referred to base hospital n (%)
1–10 <sup>a</sup>	79 (37.8)	51 (40.2)
11–20	60 (28.7)	23 (18.1)
21–30	43 (20.5)	19 (14.9)
31–40	15 (7.2)	16 (12.6)
41–50	6 (2.9)	13 (10.2)
>50	6 (2.9)	5 (3.9)
Total	209 (100)	127 (100)

<sup>a</sup> 6 (0.3%) casualties died within the first 3 days of their hospitalization.

Concerning the duration of hospitalization, the study revealed that 79 (37.8%) casualties stayed within 10 days while 130 (62.2%) of them were managed in the hospital for over 20 days. Normally, casualties evacuated to the Field hospital were managed (usually within 3–10 days), while cases requiring further definitive care were evacuated by air to the Base Hospital. Out of the 127 casualties referred to the Base Hospital, 51 (40.2%) were evacuated within the first 10 days of hospital admission while the rest (58.9%) were evacuated within 11 to 50 days as shown in Table 4. There is no doubt that managing casualties (who require prolong hospital admission) far from the theatre of war tends to reduce their apprehension, allay anxiety and possibly promote quick recovery. However, the casualty evacuation in this operation was dependent on the availability of air support from the Nigerian Air Force. Bearing in mind the inadequacy of surgical subspecialists in the Field Hospital, it is worthy to recommend that more frequent air evacuation (at least twice per week) of casualties in need of definitive care to the Base Hospital be undertaken.

Equally revealed in this study were the findings that six (0.3%) casualties died within the first three days of hospital admission while 9.1% sustained injuries from friendly fire. The poor prognosis of the 6 casualties could be attributed to ineffective pre-hospital combat casualty management and delay in evacuation from the point of injury to the

Field Hospital due to the difficult terrain and lack of airlift. Considering the asymmetric nature of this warfare, it is important to reiterate the need for medically unskilled Nigerian soldiers to have adequate knowledge and equipped to treat critical life-saving measures such as stopping severe bleeding, clearing airways, opening an intra-venous line, giving injections and minimal stabilization at the point of injury before evacuation. In addition, there is dire need to train and deploy Combat Medics who would improve pre-hospital combat casualty management in line with international best practice [25,26]. Preventing injuries from friendly fire could be achieved through joint trainings, battle inoculation and simulation exercises coupled with effective co-ordination of the Operation.

There is need to have a functional mortuary with a Pathologist in the Field Hospital to enable the conduct of autopsy on the KIAs. This would provide additional information on the pattern of injuries sustained and possible cause of death among troops.

**Conclusion**

This study determined the pattern of combat injuries sustained by soldiers on *Operation Lafiya Dole* with a view to recommending pragmatic interventions that would improve combat casualty care performance and outcome. A total of 209 casualties who were referred from the military facilities supporting the combat mission were treated at the Field Hospital. Gunshot injuries accounted for over two-third (71.3%) of all combat casualties followed by IED/blasts (14.3%). Over three-quarter (77.5%) injuries were on the upper and lower limbs while thorax/abdomen and head/neck accounted for 7.7%, and 5.7% injuries respectively. The death of six casualties within the first three days of hospital admission could be attributed to ineffective pre-hospital combat casualty management and delay in evacuation from the point of injury to the Field Hospital due to the difficult terrain and lack of airlift. Out of the 127 casualties referred from the Field Hospital to the Base Hospital for specialist care, 76 (59.8%) had a delayed air evacuation due to infrequent flight.

It is recommended that the troops be continuously sensitized on

frequent use PPEs (including Flak jacket and ballistic helmet). The military leadership should employ highly skilled Orthopaedic/trauma Surgeon to manage casualties in the Field Hospital and also train/deploy combat lifesavers and combat medics to improve pre-hospital trauma care. There should be more frequent air evacuation of casualties in need of definitive care from the Field Hospital to the Base Hospital. Joint combat trainings, battle inoculation and simulation exercises coupled with effective coordination of the Operation should be conducted to preventing self-inflicted and injuries from friendly forces. A functional mortuary should be provided with a Pathologist in the Field Hospital to enable the conduct of autopsy on the KIAs.

### Dissemination of results

Results from the study were shared with the staff of 7 Division (Field) Hospital during the monthly Hospital's clinical meeting. Hopefully, copies of the publication will be shared with the relevant authority for decision-making.

### CRedit authorship contribution statement

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: NAH contributed 40%; IBJO and OA 20%; and AJI and OJO 10% 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 declare no conflict of interest. The views expressed in this study are that of the authors and do not imply the views of the Nigerian Armed Forces or Ministry of Defence.

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