



Civilian Abdominal Gunshot Injuries at Awka, Nigeria

Mbah N*

Department of Surgery, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Nigeria

Abstract

Within a developing nation, the hospital care of abdominal gunshot injuries are fraught with numerous challenges which impact negatively on the clinical outcome. These limitations include late presentation and inability to afford the cost of care. This retrospective study was conducted to audit the pattern of abdominal injuries from gunshot in a capital city in the South-Eastern part of Nigeria, which is famous for the blacksmith trade.

From January through December 2022, abdominal gunshot injuries were seen in 19 (46.3%) of the 41 patients who presented with firearm trauma at the University Teaching Hospital in Awka, Nigeria. All the victims were males, mean age was 34.2 years. The average duration of injury prior to hospital presentation was 17.3 h. The small and large bowel were injured in 14 (73.7%) patients. One (5.3%) patient died.

A hospital policy which facilitates prompt surgical intervention accounts for satisfactory clinical outcome.

Keywords: Firearms; Civilian population; Unknown gun men; Emergency care policy

Introduction

The medical literature is awash with publications of the escalating menace of civilian gunshot injuries from the 6 geopolitical regions of Nigeria i.e. North-East, North-Central, North-West, South-East, South-South and South-West respectively [1-12]. Similarly, reports of Gunshot Injuries (GSI) within civilian populations also emanate from several other African nations [13-17]. Although peace-time firearm violence is recognized internationally, the incidence is very low in countries such as Japan and Norway with national rates fewer than 10 cases in 2022 [18-20]. These stand in stark contrast with Brazil and the United States of America (USA) which are considered to have the highest rates in the world, where the incidence of gun violence has reached epidemic proportions [21,22]. Gunshot Injuries (GSI) are attended by avoidable morbidities and fatalities. Head and neck gunshot injuries are the most fatal followed by injuries to the chest and abdomen [23,24]. The least lethal are those of the extremities.

Whereas suicidal intent characterizes a significant proportion of cases seen in the developed world, the motive behind gun-inflicted trauma differs in low-income countries [25,26]. Civilian gunshot injuries in Nigeria have been attributed to a variety of causes notably armed robbery, kidnapping, political rivalry, cultism, police brutality, accidental discharge of live bullets, secessionists activities, religious conflicts, terrorism, ethnic rivalry, land disputes, herdsman activities and farmers conflicts. Different causes tend to predominate in the different geopolitical regions of Nigeria [1-12,27,28].

This retrospective study was conducted to highlight the pattern of abdominal GSI in a capital city in the South-Eastern region of Nigeria which is famous for the blacksmith trade.

Materials and Methods

This was a retrospective study of all abdominal gunshot injuries managed at the Chukwuemeka Odumegwu University Teaching Hospital in Awka, Nigeria from January – December 2022.

Study setting: The Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) is the only tertiary health institution in Awka, the capital city of Anambra state, Nigeria. Awka city is also famously known as “the smith land” because it is the seat of the blacksmith trade in Nigeria. Anambra state is situated in the South-East geopolitical zone of the country. The COOUTH has a 200-bed capacity and operates the emergency care policy which facilitates the provision of all goods, investigations and services required for the emergency surgical treatment of patients without prior mandatory payment.

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*Correspondence:

Nonso Mbah, Department of Surgery, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), PMB 5022, Awka, Anambra State, Nigeria

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Inclusion criteria: All adult patients aged 18 years and above who presented with abdominal symptoms or signs of injury following gunshot within the study period at the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Awka, Nigeria were enrolled.

Exclusion criteria: Gunshot victims aged below 18 years, those who were brought in dead or patients who came without abdominal symptoms or signs of injury were excluded.

Data collection and analysis: The eligible patients' case notes were retrieved from the medical records department. The biographical data of the respective patients were documented along with relevant information regarding the time and location where the injury took place, the identity of the assailants, the circumstances surrounding the attack, duration prior to hospital presentation, parts of the body affected, nature of the abdominal wounds and other wounds sustained. The essential symptoms and signs at presentation were recorded. The results of all relevant blood and imaging investigations were documented. The duration between patient's arrival into the hospital and their surgical operation was calculated. The intra-operative findings, type of missile recovered, postoperative complications, duration of hospital stay before discharge or death were obtained. In some cases (n=5/19, 26.3%), missing information were obtained through phone calls to the surviving patients using their personal contact telephone numbers registered in the case notes. Tables and charts were employed for the data presentation. The results were analyzed using simple arithmetic means and group percentages.

Ethical clearance: Approval was sought and obtained from the Ethical committee of the COOUTH prior to commencement of the study.

Definition of terms:

a. Unknown Gun Men (UGM). Unidentified group of anonymous assailants who shoot to kill and dispossess their victims of firearms. They usually operate in broad day light along the road with a swift pattern to their operations while using sophisticated military weapons. They do not declare membership to any organization, although some UGM are believed to be affiliated to secessionist groups.

b. Armed robbers. Criminals who usually operate from dusk to dawn under the cover of darkness to rob their victims of various valuables including money, mobile phones, cars, jewelries etc. They often use locally made hand guns but few possess military rifles. They could operate anywhere, including people's homes or on the roadside. Exceptional cases of daylight armed robbery do occur, including bank heists.

c. Herdsmen. Itinerant cattle herders some of whom are armed with military rifles which they could use either to attack members of the communities situated along their grazing corridor or to fend off attacks against them in self-defense or in defense of their livestock.

d. Assassins. Paid murderers whose aim is to shoot and kill their assigned target, often using sophisticated military firearms.

e. Police. Arm-carrying law enforcement agents.

f. Cultist. Member of a secret gang who often shoots their victims with local hand guns either during rivalry gang fights or in order to kill an erring fellow gang member.

g. Vigilante. Private security operatives who are licensed to possess semi-automatic rifles (pump-action shot guns).

Results

Abdominal gunshot injuries were seen in 19 (46.3%) of the 41 patients who presented at the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Awka with firearm trauma during the period under survey (January – December 2022). Of the 19 cases, 13 (68.4%) came with symptoms and signs of acute surgical abdomen at presentation. The remainder developed clinical and imaging features of intra-abdominal injury during the course of their observation and treatment within the hospital. Three (15.8%) of the victims had isolated abdominal injuries alone while 16 others (84.2%) sustained coexistent gunshot injuries to other body regions (Figure 1). All the casualties were males. Their ages ranged from 19 to 63 years, mean 34.2 years (Figure 2). Majority, 8/19 (42%) of the attackers were armed robbers, but 4/19 (21.1%) were Unknown Gun Men (UGM) who shot at 2 policemen and 2 vigilante operatives to confiscate their military rifles (Figure 3). None of the incidents was suicidal or politically motivated, as none of our patients was a politician. All the patients had exploratory laparotomy. The duration of injury prior to hospital presentation ranged from 15 min to 4 days, mean 17.3 h. The interval from hospital presentation to surgical operation was 2 h to 96 h, mean 28 h. Majority of the tissue damage (12/19, 63.2%) were from multiple steel pellets whereas single metallic bullet accounted for the remainder (7/19, 36.8%) Table 1. The number of exterior gunshot wounds per victim varied

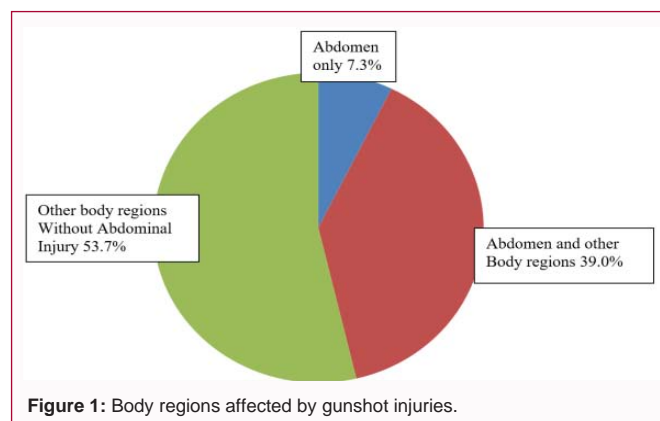


Figure 1: Body regions affected by gunshot injuries.

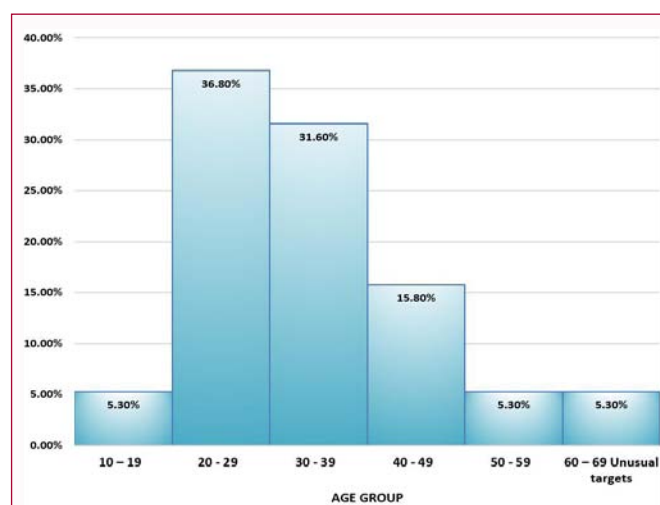


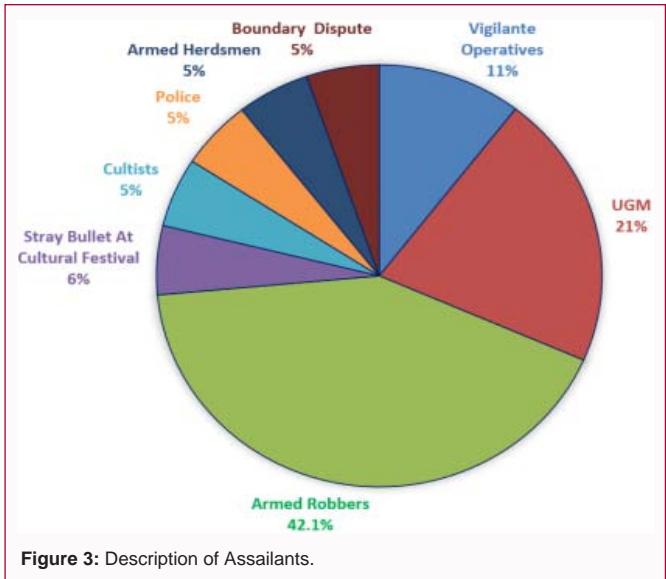
Figure 2: Age of victims.

Table 1: Description of assailants and types of bullet deployed.

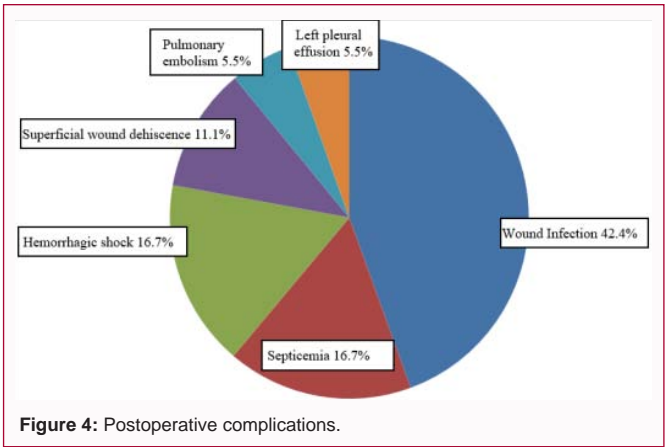
Description of assailants	Number	Percentage	Type of bullet deployed (n=Number of Cases)
Armed robbers	8	42.10%	Single metallic bullets (n=1); Multiple steel pellets (n=7)
UGM	4	21.10%	Single metallic bullets (n=4).
Cultists	2	10.50%	Multiple steel pellets (n=2)
Police	1	5.30%	Single metallic bullet (n=1)
Vigilante	1	5.30%	Multiple steel pellets (n=1)
Herdsmen	1	5.30%	Single metallic bullet (n=1)
Boundary dispute	1	5.30%	Multiple steel pellets (n=1)
Cultural Festival	1	5.30%	Multiple steel pellets (n=1)
TOTAL	19	100%	Single metallic bullets (n=7); Multiple steel pellets (n=12)

Table 2: Types of operative procedures performed.

Operative Procedures	Number
Intestinal repair ± Small bowel Resection/Anastomosis ± Chest tube placement	5
Right hemicolectomy + Repair of small bowel perforations	3
Repair of colonic perforations ± Loop ileostomy	2
Small bowel Resection/Anastomosis + Colostomy (Hartmann's procedure)	1
Liver debridement/Surgicel ± Intestinal repair	5
Splenectomy ± Intestinal Repair	3
Debridement & repair of gastric perforations + Other procedures	2
Repair of urinary bladder injuries ± Small bowel Resection/Anastomosis ± Intestinal Repair	3
Debridement of greater omentum injuries + drainage ± Other procedures including Intestinal Repairs	9
Peritoneal lavage/Drainage only	1



from 1 to 23. Those who were attacked with military rifles had fewer exterior wounds in contrast to the multiple pellet injuries seen on those who were assaulted with local guns. A single entry and exit wound were documented in 2 (2/19, 10.5%) individuals. One of these patients was shot above the left nipple with the exit wound at the right hypochondrium while the other was shot at the right buttock with the exit wound at the left flank, thereby delineating the trajectory of the missiles across the abdominal cavity respectively. Of the 41 intra-abdominal injuries recorded, the small bowel and colon were affected either alone or concomitantly in 16 patients (n=16/41, 39%), greater



omentum in 9, the liver in 5, the spleen in 3, the small bowel mesentery in 3, the stomach in 2, the urinary bladder in 3 and the finding of only hemoperitoneum in 1 individual. The procedures performed varied and were predicated by the visceral injuries sustained. Segmental resection of the injured bowel, primary intestinal anastomosis or stoma formation for stool diversion, splenectomy, liver debridement, peritoneal lavage was some of the procedures performed (Table 2). None of the patients had a second-look laparotomy, as there was no specific postoperative indication for it in this audit. Many of the patients had uneventful postoperative course. Five (26.3%) had Intensive Care Unit (ICU) admission for hemodynamic stabilization in the immediate postoperative period. Superficial wound infection was the postoperative complication with the highest frequency (n=8/19, 42%) Figure 4. Two patients (10.5%) had secondary wound

closure for superficial wound breakdown. One patient (5.3%) died in the immediate postoperative period from refractory hemorrhagic shock secondary to combined liver and multiple skeletal gunshot injuries. Average length of hospital stay among the survivors was 23 days, range 10 to 57 days. All the surviving patients had uneventful follow up over a period of 3 to 6 months after discharge from the hospital.

Discussion

Armed robbers were the predominant perpetrators of abdominal GSI in our series. This reflects the observation across most cities in the southern and northern parts of Nigeria [1,2,9,10,12]. The high rate of youth unemployment, absent tangible income support for the teeming jobless young men in the country and rising cost of living combine to foster the escalating incidence of deadly criminal activities in our society. However, communal clashes, police-related incidents, religious conflicts and insurgency played pre-eminent roles in isolated reports of GSI from some Nigerian towns [3,5,11,17,27]. These reflect the diversity and peculiar regional differences which exist within a big country as Nigeria.

We identified a subset of criminal elements, commonly referred to as the Unknown Gunmen (UGM), as being responsible for a significant (21%) proportion of abdominal gunshot trauma in our audit. These assailants differ from the regular armed robbers and kidnappers in both their identity and mode of operation. Typically, the UGM operate during daylight, and their usual targets are armed police officers whom they attack with a mission to kill and dispossess of their sophisticated arms and ammunitions. In some cases, they also assault arms-bearing members of private security units (the vigilante services) for the same motive. Their primary intention is not to steal money or personal valuables. Unlike secessionists and terrorists, the UGM do not declare membership to any organization and do not own up to the attacks thereafter. The operations of these anonymous killers have been exclusively reported from the South-East and South-South regions of Nigeria [8,11,29]. However, it is strongly believed that the UGM could be affiliated to secessionists whom they supply the stolen firearms.

Our study showed only males in their productive age group as being casualties of abdominal gunshot injuries. This is consistent with the fewer female victims of firearm violence universally reported in medical literature [1-29]. Males pose the greater threat and resistance to armed robbers, and are predominantly involved in armed conflicts. Therefore, they bear the brunt of firearm violence in stark contrast to females.

When the intention is to kill, the targeted body regions are the head, neck, chest or abdomen. About one half (46%) of the 41 GSI in our study sustained abdominal injury. The heartless and ferocious motive of the UGM to kill their victims by aiming their shots at the chest and abdomen contributed significantly to this figure. The high incidence of abdominal GSI in our survey compares with findings from a center in Lagos and another in Benin city, Nigeria but differs from most reports from other parts of the country where a greater proportion of extremity injuries was recorded [30,31]. It is popularly believed that gunshots to the limbs were intended to demobilize rather than annihilate the victims in those instances.

None of our cases of abdominal GSI was suicide-motivated, consistent with documentations from other publications from Nigeria. This is at variance with reports from Europe and USA where

the incidence of suicidal GSI is high [25,26]. Suicide is seen as taboo in several African cultures. Besides, Nigerians believe tenaciously in the supernatural which serves as a deterrent to resorting to suicide.

Most of the ammunitions used in our series deployed multiple steel pellets typical of local guns. Majority of previous authors had recorded the predominant use of locally manufactured weapons in their series across Nigeria [2,5,8,12]. However, this is at variance with the predominance of single metallic bullets characteristically released from sophisticated military rifles used in the North-Eastern region of Nigeria which is notable for terrorism by the Boko Haram militia [3]. Awka is a city famous for the blacksmith trade. Consequently, in addition to the manufacture of several valuable household metal wares, handguns are also produced locally. These weapons deploy canister shells which contain multiple steel pellets. It's therefore probable that majority of the hand guns used by assailants in our environment were sourced locally. However, this assertion is only conjectural. Consequently, the onus is on the Nigerian Police authorities to investigate the source of the assailants' weapons in order to institute effective control of the supply chain.

The small and large bowel were the abdominal viscera most frequently injured in our study consistent with reports from abdominal GSIs elsewhere [16,32]. The small gut and parts of the large bowel are distributed all over the abdominal cavity and therefore are the most vulnerable to wounding from abdominal gunshots.

Many victims of fatal gunshot injuries do not reach the hospital alive as they die either at the scene of assault or while in transit. Consequently, only the salvageable patients may be brought to the hospital alive. The clinical outcome of treatment of these salvageable cases is predicated on the quality of care delivered from the serving healthcare facility. Although the average injury to surgical intervention interval in our study was prolonged (45.3 hours), a finding that is common with other health facilities across the developing world, our surgical outcome was favorable regardless [8,31]. Unlike high income nations where injury to arrival time for these emergencies is in the range of minutes due to the availability of functional emergency ambulance services, numerous factors militate against earlier hospital presentation in Africa as had been reported by previous authors [29,31,33]. Some victims of abdominal GSI in our series were incarcerated by their assailants until ominous clinical deterioration had set in before they were released to their relatives. One of these casualties was shot by the Police and detained in their custody while another victim was shot and incarcerated by Herdsmen. Few patients presented early and those with acute surgical abdomen had emergency laparotomy. Others had delayed operation due to initial equivocal and imaging findings until signs of intra-abdominal injury became evident. The practice of "emergency care policy" at our center facilitated the institution of all necessary resuscitative measures for these patients until surgery was performed, without the prior payment of mandatory user fees. Furthermore, all the relevant investigations and services were provided under this scheme. Under this policy, the beneficiaries mandatorily offset the credit bills before they were discharged from the hospital. This facilitated the adequate preoperative optimization and stabilization of the casualties of abdominal GSI prior to their exploratory laparotomies. Mbah et al. had recorded a high mortality figure of 20.6% due to prolonged waiting time at another center in Nigeria, where the emergency care policy was not in place and the period of preoperative waiting was inimically attended by the suboptimal optimization of the laparotomy

patients [34]. Therefore, in centers where high mortality rates attend the management of abdominal gunshots, barriers inimical to prompt and adequate preoperative resuscitation and stabilization of these casualties should be removed in order to optimize clinical outcome.

Study Limitation

The small study population makes it difficult to proffer definite statistical inferences. Some adult patients with abdominal GSIs around Awka capital city during the study period may have resorted to private hospitals or other public hospitals for treatment. Similarly, those with fatal abdominal gunshot injuries who died from their wounds before arrival into our center or elsewhere were not taken into consideration. Therefore, the true prevalence and epidemiology of this injury in our practice environment was probably greater than our study revealed. Furthermore, being a retrospective study, it is fraught with the inherent limitations which characterize surveys of this sort. However, we mitigated the challenges posed by the historical nature of this study by contacting some of the patients over the telephone to provide any missing relevant information, an approach which had been recommended as reliable [35].

In conclusion, the spate of peace-time gun violence escalated the insecurity of civilian lives with significant morbidity during the period under review. The implementation of an emergency care policy facilitated the prompt preoperative stabilization and optimization of salvageable casualties of abdominal gunshot injuries which reduced surgical mortality. Necessary legislation should be promulgated by the legislature at both the state and national levels to control and regulate the manufacture and sale of locally manufactured hand guns by blacksmiths.

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