International Surgery Journal
Obene TA et al. Int Surg J. 2022 Oct;9(10):1689-1693
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20222592

Original Research Article

Presentations of gunshot injuries to the extremities in a tertiary hospital in Port Harcourt

Tonye Adiyi Obene[1]*, Victor Abhulimen[2]

[1]Rivers State University Teaching Hospital, 6-8 Harley Street, Old GRA, Port Harcourt, Nigeria
[2]University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria

Received: 25 August 2022
Accepted: 15 September 2022

***Correspondence:**
Dr. Tonye Adiyi Obene,
E-mail: Taobene1@gmail.com

ABSTRACT

Background: There is an increasing incidence of gunshot injuries in most countries around the world. Causes of gunshot injuries include herdsmen assault on communities, religious and ethnic riots, student cultism, inter-tribal wars, accidental injuries at funeral ceremonies and politically motivated murder. This study aims to highlight the presentations of gunshot injuries to the extremities in Port Harcourt.
Methods: This was a prospective carried out on all patients who presented with gunshot injuries to the extremities at the University of Port Harcourt Teaching Hospital during the period of the study. Data on age, gender, anatomical region of the body involved in the injury, nature of the gun used, time between injury and presentation at the hospital were obtained. The information gotten was analyzed and presented in form of tables and figures.
Results: Eighty-two subjects with 106 injuries were evaluated. Mean age±SD=28.28±8.04 years. Seventy were males and 12 females (M:F=5.83). Most were unmarried and unemployed. Eighty nine percent presented to the hospital within 6 hours of injury. The AK 47 and locally made pistol were the most used weapons. The left extremity was more affected than the right.
Conclusions: This study showed that young adult unemployed males suffered more gunshot wounds than females. Subjects presented early to the hospital. The AK 47 and the local pistol were the weapons mostly used in inflicting these injuries. Most injuries were sustained on the leg.

Keywords: Gunshot injury, AK 47, Pistol

INTRODUCTION

Gunshot injury or ballistic trauma refers to physical trauma sustained from the discharge of arms or munitions.[1] There is an increasing incidence of gunshot injuries in most countries around the world. In the United States of America, it is described as having reached epidemic proportions with 645 mortalities in an average week and 1565 more persons treated in an emergency department for a firearm-related injury.[2] Before the Nigeria civil war began, gunshot injuries were relatively uncommon and this was to be the dawn of a new era of gunshot injuries in Nigeria.[3] The pattern of injuries seen during the war was very different from the civilian gunshot injuries seen afterwards. A study conducted at the University College Hospital, Ibadan found armed robbery attack to be the commonest cause of gunshot injuries and the lower limb the most commonly injured area.[4] Another study done in Irrua, Edo state found gunshot wounds to be most common in young males in the third decade of life and the extremities as the most common part of the body involved. It was noted that 69.7% of these patients were victims of armed robbery attacks.[5] Other causes of gunshot injuries in Nigeria apart from armed robbery attacks include herdsmen assault on communities, religious and ethnic riots, student cultism,

inter-tribal wars, accidental injuries at funeral ceremonies and politically motivated murder.[6]

The University of Port Harcourt teaching hospital is a major trauma referral facility in Rivers State, Southern Nigeria. It provides service to residents of not only Port Harcourt but the neighbouring villages, towns and cities. There are a high number of trauma patients who are referred to this centre for gunshot injuries to the extremities. A retrospective study on gunshot injury has been carried out by Alabi et al.[7] in Port Harcourt. There are no previous prospective studies done in this centre, which evaluated gunshot wounds to the extremities. This study aims to highlight the presentations of gunshot injuries to the extremities in Port Harcourt.

METHODS

This was a prospective non-randomised hospital-based study conducted over a 12-month period between October 2018 and September 2019. This study was carried out on all patients who presented with gunshot injuries to the extremities at the University of Port Harcourt Teaching Hospital during the period of the study. This study was carried out at the orthopaedic outpatient clinic, accident and emergency unit, male and female orthopaedic wards of the university of Port Harcourt Teaching Hospital.

This was calculated using the formula[8] for determination of sample size for estimating proportions:

$$n = Z\alpha 2\, p\, (1-p)/\mathrm{d}2$$

Where n=the desired total sample size, Zα=the assumed standard deviation set at 1.96 which corresponds to 95% confidence level, p=the proportion in the target population estimated to have a particular characteristic. 50% is used since there is no reasonable estimate and d=degree of accuracy set at 10%. Applying the above formula sample size was calculated to be 96 and with 10% attrition 106 was considered as final sample size.

All patients admitted to University of Port Harcourt Teaching Hospital who suffered gunshot wounds to the extremities were included in the study. Patients who did not give consent to the study, patients who left the hospital against medical advice, indigent patients who could not afford to do plain radiographs, patients with psychiatric illness who would have posed a follow up difficulty were excluded from the study.

All patients who met the inclusion criteria had written consent obtained from them and recruited into the study. Detailed history was then obtained with emphasis on age, gender, anatomical region of the body involved in the injury, nature of the gun used, time between injury and presentation at the hospital. A detailed clinical examination was then carried out with focus on the musculoskeletal system.

Preoperative investigations included haemoglobin concentration, blood grouping, urinalysis, serum urea & electrolytes and plain radiographs of the affected limb(s). Radiographs were taken in two views; anteroposterior (AP) and lateral views (LAT) to determine the pattern of injuries and the presence of shrapnel, bullets or pellets. Computed tomography (CT) scan of the involved limbs were ordered where necessary to properly characterize the fracture. The fracture(s) were classified using the RCWS system. The time interval between the injury and hospital presentation was recorded. Tetanus prophylaxis was given to all patients and where necessary, blood transfused.

Complications such as wound infection, chronic unhealed ulcer, and joint stiffness were documented when they occurred. Wound swab culture with bacteriologic counts of 105-106 per gram of tissue or per millilitre of fluid was considered an infection. Although not part of the Red Cross Wound Score protocol, nerve damage was looked out for and recorded. Our role as the researchers involved obtaining the clinical history and performing the physical examination. We also performed the initial resuscitation of some of the patients and subsequent surgeries either as the lead surgeon or the assistant. Other members of the surgical team were also involved in obtaining the data using the study proforma after learning how to use the RCWS classification system.

Data was obtained using a prepared proforma (Appendix IV) and then entered into Microsoft Excel and then exported to the Statistical Package for Social Sciences (SPSS) Version 20 for statistical analysis. Data was presented appropriately using tables and charts. Normality of data was assessed using Kolmogorov-Smirnov Statistics prior to analysis. Normally distributed data was summarized using means and standard deviation while medians and ranges were used for variables that are not normally distributed. Categorical variables were expressed as absolute frequencies and percentages. Independent t test was used to compare the differences in means across two categories while Mann-Whitney U test was used to compare the differences in medians across categories. The relationship between categorical variables was compared using Chi square test or a Fisher's exact test when the expected cell count was less than five in at least twenty percent of the cells. Statistical significance was set at a level of 0.05. The hospital number of the patient was used instead of the name for data collection.

RESULTS

This study had a total of 106 gunshot wounds to the extremities from 82 patients who were hospitalized during the period of the study.

Socio-demographic characteristics

Seventy (85.4%) of the 82 patients in the study were males and 12 (14.6%) were females. The mean ages were

28.16±7.75 years and 29.00±9.95 years for males and females respectively. This difference in the mean ages was not statistically significant (t=0.334; p value=0.740). The age range of the patients was 6-54 years. Those between the ages of 25-34 years formed the highest proportion (47.6%; N=39 patients) while those less than 15 years constituted the least proportion (2.4%; N=2 patients). Higher proportion of the patients were singles (90.2%) and 56.1% were unemployed (Table 1).

Table 1: Demographic characteristics of patients.

Variables (n=82)	N	%
Age (years)		
<15	2	2.4
15-24	26	31.7
25-34	39	47.6
35-44	11	13.4
45-54	4	4.9
Mean±SD=28.28±8.04		
Sex		
Male	70	85.4
Female	12	14.6
Marital status		
Single	74	90.2
Married	8	9.7
Occupation		
Unemployed	46	56.1
Self-employed	23	28.0
Employed	13	15.8

Time interval between injury and presentation to hospital following gunshot

Most of the patients presented within the first 6 hours of injury 73 patients (89%) as shown in (Figure 1). Median time to hospital presentation was 2 hours and the range of time to hospital presentation was from 1-160 hours.

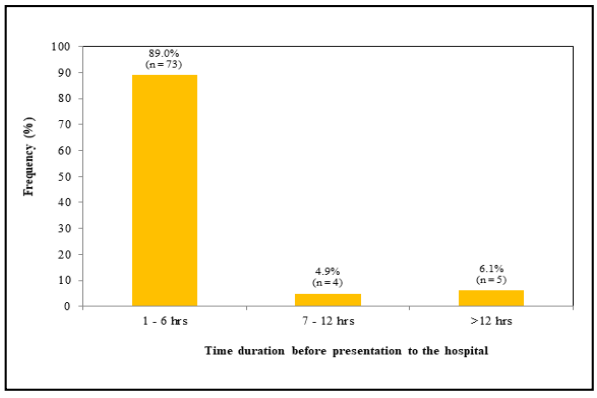

Figure 1: Time duration before presentation to the hospital among patients with gunshot.

Type of weapon used by assailant

The AK 47 (Kalashnikov) and local pistol were the most frequently used weapons (32.9% each), while 26.8% of the wounded did not see or could not identify the weapon used, and 7.3% of the injuries were caused by shotguns (Figure 2).

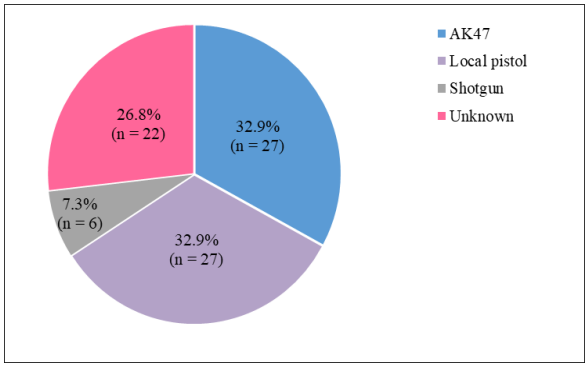

Figure 2: Distribution of weapon used to inflict injury on the patients.

Anatomical distribution of gunshot wounds

A total of 30 wounds were in the left leg, 17 in the right leg, 24 in the left thigh, 17 in the right thigh, 11 in the left arm and 7 in the right arm making a total of 106 wounds (Figure 3). The leg was the most frequently injured region (43.4%), followed by the thigh (38.7%) and the arm (17.9%) (Table 2).

Table 2: Distribution of gunshot wounds

Variables	N	%
Number of wounds		
One	58	70.7
Two	24	29.3
Location of wound*		
Thigh	41	38.7
Leg	46	43.4
Arm	19	17.9
Side of wound*		
Left	65	61.3
Right	41	38.7

*Total of 106 wounds.

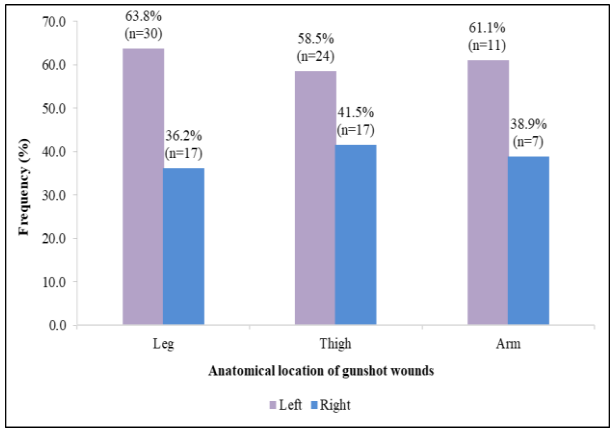

Figure 3: Anatomical location of gunshot wounds.

DISCUSSION

Energy is neither created nor destroyed but converted from one form to another. The injury sustained in gunshot injury depends on the proximity of the subject to the gun and the velocity of the gun. High velocity rifles tend to produce more damage than low velocity rifles. Also, the closer you are to the gun the more the damage. Gunshot wounds have become a common emergency in most hospitals in our environment. The findings from this study have highlighted the magnitude and impact of firearm related violence in the study setting. In this study, gunshot wounds were found to be most common among males. Several other studies done on gunshot wounds, also found higher percentage of male victims.[8,9,10] This may be because young males are more adventurous and more aggressive in their response to a threat.[8] Although, all age groups were affected, the most affected age group were in their late twenties and early thirties (28.16±7.75 years and 29.00±9.95 years for males and females respectively). This finding is in keeping with similar studies done on gunshot wounds at the Obafemi Awolowo University Teaching Hospital where 78.9% of the patients where below the age of 40 years[9] and in the Lagos University Teaching Hospital where 52.5% of the patients with extremity gunshot wounds were between the age of 21 and 40 years.[10]

It is noteworthy that most of the patients presented within the first 6 hours of wounding, which could be attributed to the associated bleeding of gunshot injuries and the consequent fear of impending death `without treatment. This time to presentation in hospital is similar to another study on the pattern of civilian gunshot wounds in Irrua.[8] A high proportion of the wounds were inflicted by the high velocity AK 47 rifle causing a lot of soft tissue as well as osseous damage. This finding is in keeping with a study conducted by Umaru et al in Maiduguri, where the AK47 rifle was also found to be the most frequently used weapon.[11]AK 47 rifles and locally fabricated pistols were the most commonly used weapons in inflicting gunshot wounds in the patients seen during this study. This finding, therefore, exposes the need for stringent regulations regarding gun control.

The legs were the most frequently affected region of the body (43.4%), closely followed by the thigh (38.7%) and then the upper limbs (17.9%). A probable reason may be because the assailants do not initially intend to kill, but to immobilize their victims. The left leg in particular had the highest frequency. This may be explained by the fact that there were more right-handed assailants coming face to face with their victims. This is different from the study done in Irrua, where the upper extremity was found to be the most involved anatomical region.[8]

Limitations

This study was carried out within a year, this limited the sample size. Patients who wanted to participate in this study but could not afford an X-ray were exclude from the study. This study only evaluated injuries to the extremities.

CONCLUSION

This study showed that young adult unemployed males suffered more gunshot wounds than females. Subjects presented early to the hospital. The AK 47 and the local pistol were the weapons mostly used in inflicting these injuries. Most injuries were sustained on the leg and right side of the extremity.

Recommendations

Stricter gun control laws to prevent procurement and production of these weapons. Stricter border control to prevent smuggling of these weapons into the country.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Mahoney PF, Ryan J, Brooks AJ, Schwab CW. Introduction, background and science. In: Ballistic Trauma: A practical guide. 2nd ed. USA: Springer; 2004:4-9.
2. Fowler KA, Dahlberg LL, Haileyesus T, Annest JL. Firearm injuries in the United States. Prev Med. 2015;79:5-14.
3. Odling-Smee GW. Ibo civilian casualties in the Nigerian Civil War. Br Med J. 1970;2(5709):592-6.
4. Afuwape O, Alonge T. An audit of gunshot injuries seen in the accident and emergency department of a Nigerian tertiary hospital. West Afr J Med. 2006;25(4):295-7.
5. Onuminya JE, Ohwowhiagbese E. Pattern of civilian gunshot injuries in Irrua, Nigeria. S Afr J Surg. 2005;43(4):170-2.
6. Solagberu BA. Epidemiology and outcome of gunshot injuries in a civilian population in West Africa. Eur J Trauma Emerg Surg. 2003;29(2):92-6.
7. Alabi A, Harcourt SL, Ijah OA, Friday R, Aaron FE. Gunshot Injuries in Port Harcourt, Nigeria: The University Teaching Hospitals' Experience. Int J Trop Dis Health. 2021;5:1-7.
8. Onuminya JE, Ohwowhiagbese E. Pattern of civilian gunshot injuries in Irrua, Nigeria. S Afr J Surg. 2005;43(4):170-2.
9. Ogunlusi J, Oginni L, Ikem I, Olasinde A, Hamilton O, Akinbolagbe A, et al. Gunshot injuries in a Nigerian Hospital. Niger J Orthop Trauma. 2006;5(2):34-7.
10. Obalum DC, Giwa SO, Ogo CN. Pattern of extremity gunshot injuries seen in Lagos University Teaching Hospital, Lagos, Nigeria. Nig Q J Hosp Med. 2007;17(4):140-3.

11. Umaru H, Bwala S, Bunu B. Fire arm violence in northeastern Nigeria: University of Maiduguri teaching hospital experience. IJMMS. 2012;2(8):171-4.

Cite this article as: Obene TA, Abhulimen V. Presentations of gunshot injuries to the extremities in a tertiary hospital in Port Harcourt. Int Surg J 2022;9:1689-93.