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Original Article

Epidemiology of gunshot injuries in Kano, Nigeria

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Abstract.

Backkground: The incidence of civilian gunshot injuries has been reported to be on the increase globally. This study was undertaken to determine the epidemiology of gunshot injuries in Kano, Northern Nigeria.
***Patients AND Methods*:**A retrospective analysis of patients with gunshot injuries seen at five major government hospitals in Kano metropolis over a four year period (1999-2002).
***Results*:** There were 224 cases, with males out-numbering females by a ratio of 27:1. Eighty -one point three percent of patients were aged between 20 and 44 years. The most commonly injured body regions were the lower limbs (31.6%), chest (15.6%) , upper limbs (9.4%) and head (9.0%). A fatal outcome was recorded in 12.5% of cases. Most injuries occurred among traders, students, farmers and security agents, and armed robbery attacks and civil conflicts were the aetiological factors in majority of cases.
Conclusion: Gunshot injuries are a major cause of morbidity among adult men in Kano. Addressing the root causes of violence such as poverty, unemployment, and substance abuse will reduce the incidence of gunshot injuries in our society.
Key words: Gun-shot injuries, Firearms, Epidemiology.

Introduction

Firearms are the most destructive of readily available weapons in modern society. Within the last two decades, the incidence of civilian gunshot injuries and their ensuing fatalities have been on the increase worldwide.[1] Although considerable differences exist between world regions and individual countries, the incidence is highest in lower income countries.[2] This has reached epidemic proportions in Countries such as Brazil, Columbia and United States of America where it is expected that by the year 2003, the number of deaths from firearms will surpass the number caused by motor vehicles, to become the leading cause of injury- related deaths. [3] Even more worrisome are findings which indicate that the burden of firearm violence is borne to a considerable degree by the most productive segment of the society i.e those aged between 15-44 years, males out numbering females by a wide ratio.[4] Relative to other weapons such as knives, guns tend to be associated with greater long term physical consequences, resulting in suffering, disfigurement, disability and above all death. To individual families they cause physical and psychological turmoil, while their cost to society in both human and economic terms is enormous.[1] There is scarcity of information in most developing countries on both morbidity and mortality due to gunshot injuries where greater emphasis has been placed on injuries related to Road traffic accidents, which are more common. This study was undertaken to analyse the cases of civilian gunshot injuries in our environment in order to highlight the epidemiology of the condition and suggest preventive strategies.

Patients and Methods

This is a retrospective review of cases of gunshot injuries reported to the Criminal Investigation Department of the Nigerian Police Kano, Nigeria, over the 4 year period, January 1999 to December 2002.

The hospital records of the cases were retrieved from the medical records department of five major government hospitals in Kano metropolis; Aminu Kano TeachingHospital, Murtala Mohammed Specialist Hospital, National orthopaedic Hospital, Dala, Armed Forces Specialist Hospital and Nassarawa (MAWSH) Hospital. The information extracted from the patients case notes were the age, sex, occupation of victims, circumstances of injury, type of injuries sustained, and outcome relatedto duration of hospital stay and fatality. Autopsy records complemented the findings in fatal cases. Referred cases of gunshot injuries from neighboring states and victims of war from Sierra Leone were excluded.

Results

A total of 224 cases were recorded during the 4 year period. One hundred and ninety six (87.5%) were males and 28(12.5%) were females giving a male to female ratio of 27:1. Figure 1 shows the age distribution of cases. The patients were aged between 10 and 64 years, with a peak in the 25-29 years age group. Majority (81.3%) were between 15 and 44 years. Distribution of cases according to occupation in figure 2 shows that most injuries occurred among traders 40(20.7%), students 34 (17.6%), farmers 31 (16.0%) and security agents 28 (14.5%). Armed robbery attacks and civil conflicts were the cause in three quarters of cases as depicted in figure 3 . Figure 4 shows that the most commonly injured body regions were the lower limbs 71 (31.6%), chest 35 (15.6%) upper limbs 21 (9.4%) and head 20 (9.0%). The average length of hospital stay was 18 days (range 1-44 days) for patients without fractures, and 80 days (range 15-180 days) for patients with fractures. A fatal outcome was recorded in 28 (12.5%) of cases mainly attributable to chest 9 (32.1%), head 6 (21.4%) and lower limb 5 (17.9%) injuries, as shown in figure 4, the remaining 8 (28.6%) being cases of gunshot injury to the abdomen, upper limbs and multiple sites

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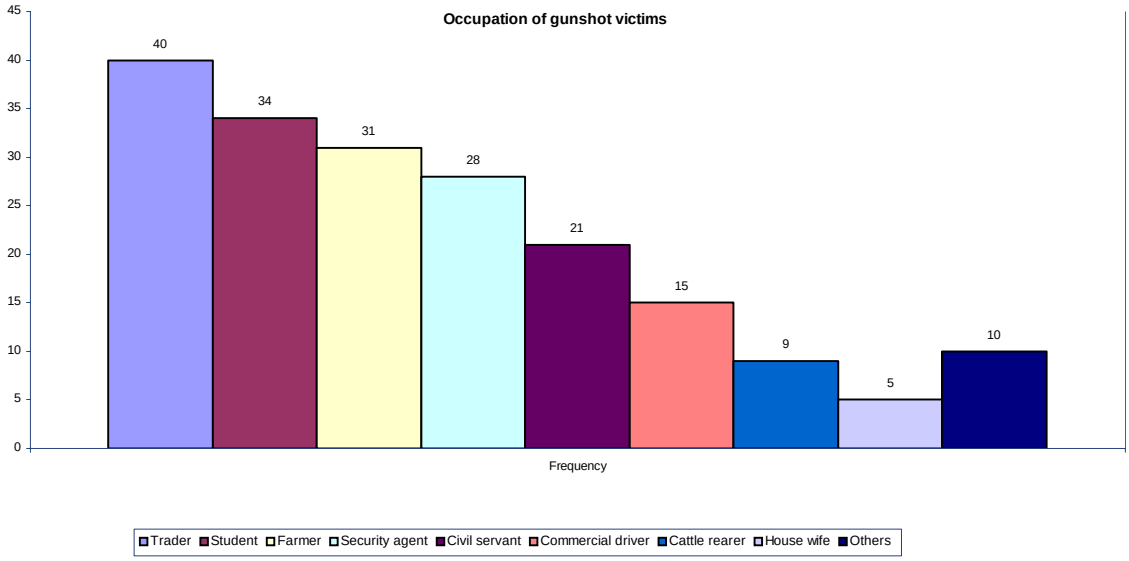
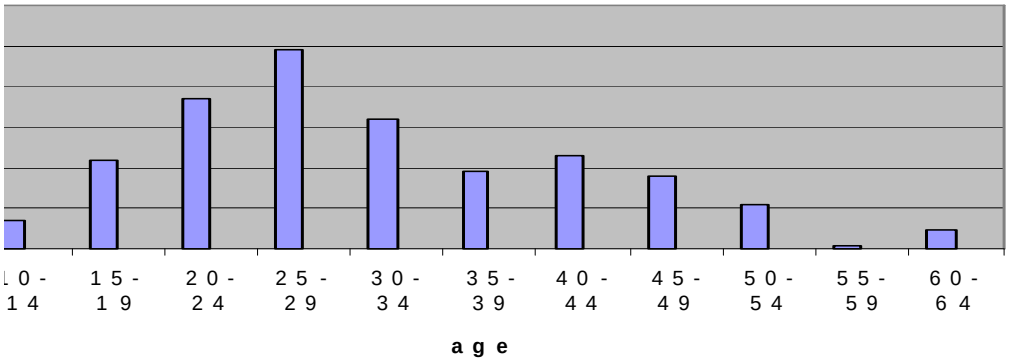


Fig1 Gunshot injury and age.



Discussion

In this review, gunshot injuries were found to be a major cause of trauma-related morbidity in Kano with an average frequency of 56 cases annually. This may actually be an underestimate and the magnitude of the problem may not be apparent because many cases are not reported to the police for fear of arrests or other reasons. Furthermore, persons who die at the scene of shooting are frequently hastily buried by relations in keeping with religious customs. Several other cases may also have been treated in private hospitals which were not included in the present study. International studies have shown that a significant number of violent incidents that receive medical attention are not reported to the police.[4-6] This varies from 46% in the United States to between 50 and 80% in South Africa and one-half to three quarters of victims in the UK. [4-6]

As demonstrated by the results of this study, the burden of firearm violence is borne to a considerable degree by youths and young adult males aged between 15-44 years. Although this corresponds with the first age peak in WHO mortality database from 48 countries, WHO data further reveal a second peak after the age of 80 years attributed to suicides which were not recorded in our study.[3] Male youths are more often involved in interpersonal violence and are indeed the principal perpetrators of civil conflicts and armed robbery.

The lower limbs (mainly the thighs) were the most frequent body region injured followed by the chest, upper limbs, and head even though injuries to the chest, head and the lower limbs in decreasing order were responsible for most deaths. This is similar to experiences in Recife, Brazil,[7] but differs with the findings in Benin and Lagos, Nigeria where abdominal wounds predominated.[8,9]

It is suggested that the ratio of fatal to nonfatal injuries is likely to be smaller in developing countries because of the lack of proper medical care. For every one person shot and killed in Kano, 8 others were treated for nonfatal gunshot wounds just like the experience in Benin, but the ratio is less in the USA where 3 persons are treated for each fatal case.[8,10] The higher fatality in USA may not be unrelated to the shift away from the use of revolvers in favour of high caliber pistols which are more lethal.[11] The firearms used in Nigeria are mainly low velocity handguns, high velocity firearms being used predominantly by police and other security agents. These high velocity weapons were responsible for several deaths which occurred at the scene of the shooting in extrajudicial killing of criminals in so-called 'legal intervention' by police.

Armed robbery attacks were responsible for the greatest proportion of gunshot injuries and fatalities in keeping with reports from other Nigerian cities. [8,9] A robbery attack in the home is more likely than that on the highway to result in fatality (21.4% vs 14.3%) probably due to the close range of fire. The decline in levels.[17] By knowing which localities have high rates and/or fast increases in rate should assist in developing more effective prevention programmes.

the Nigerian economy over the last two decades coupled with rising unemployment, income inequalities and poverty have contributed to the rising wave of armed robbery.

Civil conflicts which occur sporadically in Nigeria over political, religious and ethnic differences were second to robbery attacks as a cause of gunshot injury. Self accidents while carrying or cleaning hunting guns were observed in few cases as were cases of police officers mistakenly shooting their colleagues during operations, and hunters who mistake one another for game. A disturbing trend was observed in the occurrence of accidental stray bullets which injure innocent bystanders during attempts by security agents to arrest criminals.

A contributory factor to increased morbidity and mortality was the lack of efficient emergency health care services for pre-hospital care and rapid transport of injured victims to hospital which results in possibly 'preventable deaths'. The absence of disaster management facilities is also noteworthy as the availability of blood transfusion and other emergency facilities are overwhelmed when there are mass casualties during civil conflicts. The average length of hospital stay of gunshot victims in Kano was 18 days (range 1-44 days) for non-orthopaedic patients and 80 days (range 15-180 days) for those with bone fractures which is significantly longer than 13 and 11 days average for patients in Finland and USA respectively.[12,13] Long term physical and mental disability frequently accompanied such non-fatal injuries.

Several studies have described the consequences of non-fatal injuries which include brain injury a common sequelae in the United States [14] and gunshot spinal cord injuries which have a high prevalence in Soweto, South Africa and in several State capitals in Brazil.[15,16] Limb amputations for severe injuries are also among the disabling consequences noted in several of our patients.

The hospital cost for gunshot injuries is but a fraction of the price paid by victims, because of legal and administrative fees, cost of rehabilitation, lost productivity and quality of life. Because firearm injuries and deaths occur mainly in young healthy productive persons, it represents a tremendous economic loss to the nation. The consequent drain on the meager resources of the victims and our impoverished health systems cannot be overemphasized. Firearm injuries are a public health problem of national or international dimensions which are largely preventable. The wide variation in firearm death rates between nations and within nations suggests that risk factors will vary by locale and hence strategies for reducing firearm injuries must be established at sub-national levels at the state and local

Primary prevention requires addressing the risk factors and their root causes particularly poverty, unemployment and substance abuse to deal

adequately with violence in our society.[2] Although the circumstances of Armed Robbery, civil conflicts, assault and extrajudicial killings differ, the above mentioned root causes are common to each, thus a multifaceted approach of prevention is required. Reducing poverty and inequalities within societies, promoting a culture of tolerance and dealing with conflict on a non violent basis, promoting gender equity and developing programs to improve systems of governance are all useful steps in violence prevention. Handguns in the hands of the civilian population serve little purpose, hence limiting access to handguns and greater efforts to enforce legislation banning the possession of firearms are additional steps required.[18]

Formation of disaster management centers in major cities improvement of systems of emergency trauma care delivery, rapid and skilled transport of injured victims to hospital, better and early management and more effective treatment of the late complications will substantially decrease the present mortality rates recorded in our society.[19] These measures have been found to be quite effective as graphically demonstrated in military experience and in a comparative study of 3 hospitals in Ghana, Mexico and the United States.[20,21]

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Conclusion

Gunshot injuries are a common cause of trauma-related morbidity and mortality in Kano. Youths and young adult men are the principal victims, and armed robbery attacks and civil conflicts are the major causes. Addressing the root causes of violence such as poverty, unemployment, income inequality and substance abuse are important prevention strategies

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