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Health implications of small arms and light weapons in eastern Uganda

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Abstract

Injuries due to small arms and light weapons (SALW) are common in developing countries with ongoing collective violence, or those that exist in a post-conflict state. Uganda has a long history of armed conflict, but little quantitative evidence is available about the extent of the problem of SALW. We performed a review of all injuries due to SALW at Mbale Regional Hospital in eastern Uganda for the six-year period 1998–2003. Using a standardised questionnaire, we recorded information from over 200 cases concerning the characteristics of the victim, the incident, the weapon used and the care received. The majority involved males and occurred in the context of conflict within tribal communities, or armed robberies throughout the region. Each injury is of significant cost to the healthcare system and to the victim. Prevention, through limiting the availability of the ‘vector’ of disease (SALW), is a key part of the solution to this problem.

Keywords: *Health effects, Peace through health, Small arms and light weapons, Uganda*

Introduction

Small arms and light weapons (SALW) are those that can be operated by one or two individuals and include handguns, assault rifles, machine guns, grenades and landmines [1–3]. It is estimated that there are 639 million small arms globally and more than half the world’s countries are involved in producing the 7.5 to 8 million new weapons and 10–14 billion rounds of ammunition annually [1]. These weapons are believed to cause the majority of deaths in conflict globally and increase the number of deaths occurring during robbery or assault, as well as enhancing the lethality of suicide. Estimates of the direct death toll due to SALW range widely from 80,000 to 500,000 per year and occur predominantly in the developing world [2,4–8].

However, indirect deaths due to SALW are probably much higher than this as they provoke and prolong conflicts [5,9–14], precipitate genocide [15] and disrupt the provision of humanitarian assistance and development initiatives [16–20], especially those directed towards women and children [21].

Attempts to control and limit trade in SALW, or track weapons and ammunition, have so far been nearly impossible [1–3,5]. To understand the severity of the problem and assist with advocacy efforts, groups such as the International Action Network on Small Arms (IANSA) have called for more research into the impact of SALW on health [22]. International Physicians for the Prevention of Nuclear War (IPPNW) has echoed this in its ‘Aiming for Prevention’ campaign, which notes that the paucity of data on the direct and indirect health effects of SALW was hampering regional efforts to curb their use [9,10]. Such information, as well as prospective injury surveillance, would assist with the monitoring and evaluation of preventative interventions [23]. However, such evidence from ‘disorganised settings’, including areas of active or recent conflict, is difficult to obtain [24,25]. Public health officials, physicians and peace activists often do not, or cannot, collect sufficient information on health and development indices, which would permit an assessment of the impact of the conflict on health and the role of SALW.

Uganda is a potential area to study the health effects of SALW. It is a country that has suffered from conflict since independence in 1962. Currently, an 18-year war continues in the northern region, with the government fighting the Lord’s Resistance Army (LRA), an insurgency group characterised by brutal human rights abuses, the abduction of children for use as soldiers and an apocalyptic religious vision [26,27]. This conflict has been fuelled by SALW [28,29] left over from previous Ugandan conflicts, from the conflict in the adjacent Democratic Republic of Congo [18,30], and from sources within the Sudanese government. Sudan provided military aid to the LRA, in response to the Ugandan government’s backing of the Sudanese People’s Liberation Army/Movement (SPLA/M), an insurgency group in southern Sudan [26,31–33]. In addition, conflict continues in the east involving the border region with Kenya, between pastoralist tribes known as the Karamojong, the tribe predominantly in Ugandan territory, the Pokot and the Turkana. Cattle rustling, and disputes over limited resources have existed for many years, but the ready availability of SALW in recent years [34,35] has greatly increased the damage they cause. Government forces have also fought the pastoralists, during efforts to disarm them forcibly, when a voluntary disarmament programme only netted 10,000 of the 30,000–100,000 estimated weapons [34,36]. Ironically, in a recent effort to enlist the assistance of the Karamojong against the LRA, who have pushed further east, the government has begun arming these pastoralist groups once again [37], as well as Local Defence Units (LDUs) of civilians [38,39].

Only limited information is available about the availability of SALW in Uganda, mostly from the Small Arms Survey [1]. It is estimated that there are 630,000–950,000 small arms in Uganda, or 3–4.5 small arms per 100 persons. While this is a low prevalence compared with the global situation, the majority, or 60 per cent (475,000) are in civilian hands, while armed forces hold 34 per cent (270,000) and police 3 per cent (24,000). Armed insurgents and tribal populations are estimated to have only 3 per cent (21,000). This last figure is probably an underestimate as it is based on predicted numbers of insurgents and tribal combatants and uses a multiplier of small arms per person derived from other situations. As noted above, other sources suggest the Karamojong alone possess possibly 100,000 small arms [36]. It is known that a significant number of weapons came into Kramojong possession when they raided the Moroto armoury as the government of Idi Amin fell [34]. Regardless of the actual number of SALW, the destructive power of even a single weapon is significant as it can be used in multiple instances.

Truly accurate numbers are impossible due to the constant flow of SALW in and around Uganda within the Horn of Africa. The map in Figure 1 is based on reports of active trading, arms markets and documented transfers. Weapons remain in circulation long after a conflict and continue to be purchased from abroad by governments in the region and insurgent groups.

Eastern Uganda was chosen as a site to study the impact of SALW on health for several reasons. It is currently a safe location, with sufficient infrastructure to support research, but is in close proximity to the northern conflict and to the conflict involving the Karamojong. Many of the cases of injuries and deaths from these conflicts present to Mbale Regional Hospital, as well as those due to robbery, assault, accidents and other non-conflict situations. Mbale Regional Hospital is one of only ten regional referral healthcare facilities in the country, and serves a catchment area of approximately three million people [41]. No previous study of injuries due to SALW has been carried out in this region.

The purpose of this study was to describe and quantify the burden of injuries and deaths due to small arms in eastern Uganda within a six-year time span as documented by hospital records. In addition, to investigate the numbers, availability and sources of small arms in the region, the characteristics of incidents involving small arms and the cost to society of such incidents.

Methods

Ethics approval was obtained from the Medical Superintendent of Mbale Regional Hospital. A review of patient charts of all cases of injuries and deaths due to small arms presenting to Mbale Regional Hospital was carried out. Charts were identified by reviewing discharge records from the surgical

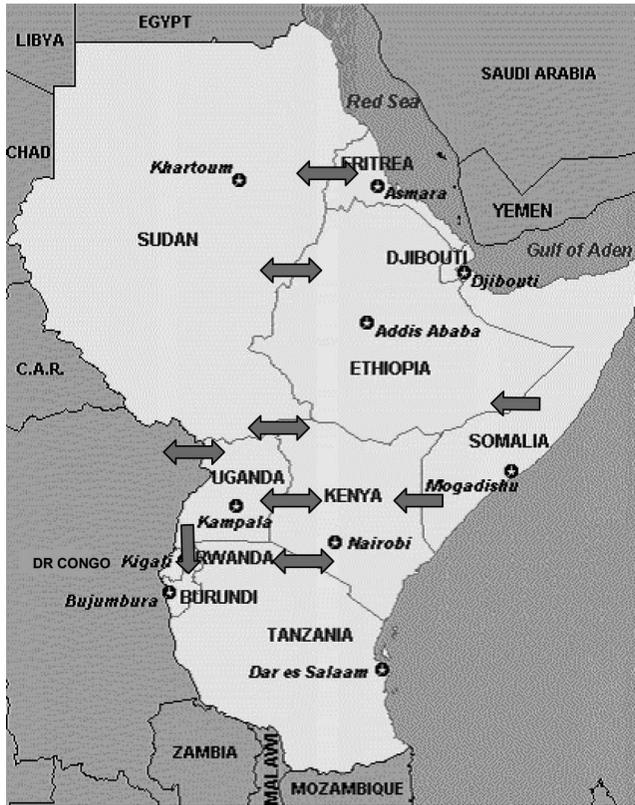


Figure 1. The flow of SALW around Uganda. Sources: Refs. 1, 8, 19, 30, 34, 40.

wards of the hospital for all admissions in the period between January 1998 and December 2003. This time period was chosen due to the completeness of the records and it was felt that six years of data would present a reasonable picture of the impact of SALW on health in the region. Cases were catalogued at discharge by International Classification of Diseases (ICD) codes and for this study, code 'W34' for 'gunshot injuries' was used to identify potential charts. Charts were also reviewed from the private wing of the hospital, to ascertain if there were substantial differences between the cases presenting to either the public or private system. However, these discharge records were not coded using the ICD system, and it was necessary to scan the descriptions of 'reason for admission' for any indication of a gunshot wound or other injury due to SALW. A 'case' was defined as a person who has been injured or killed in a single incident involving a small arm. A unique case number was assigned to each case. This information was corroborated with emergency department records, ward discharge reports and public health statistics collected on patients with injuries due to all causes presenting to local health units and hospitals.

Charts were then retrieved and reviewed by two of the authors (ADP and PO-O). Data was collected using a standardised form for case analysis. This form follows previously published forms used in similar studies [42,43] and WHO recommendations for injury surveillances [44]. All forms were processed at Mbale Regional Hospital by one investigator (ADP) and analysed using Microsoft Excel. The out-of-pocket cost of healthcare was estimated by recording details of medications prescribed, the number of radiographs and transfusions. This did not include other personal expenses while in hospital. One investigator (PO-O), who was a staff physician at the hospital and familiar with the costs of these items, calculated the total expense incurred by each patient. Thus a ‘patient perspective’ on the impact of the injury was estimated. The cost per day of inpatient care was calculated by consulting with the hospital administration and other local physicians. An approximation of 25,000 USH (Uganda shillings) (US\$14) per day was arrived at, including nursing care, room stay and dressing changes. This figure did not include ‘hotel costs’ or the expense of running the hospital on a day-to-day basis, including utilities, rent, equipment, physician salaries and administrative costs.

Results

Using discharge records, 294 distinct cases of injuries due to SALW were identified over the six-year period, an average of 49 per year, with 229 receiving public health care and 65 receiving private health care. Of these, 206 charts (70.1 per cent) were located and analysed (190 public, 16 private). An increasing number of injuries due to SALW were treated from 1998 to 2003. Possible causes of this include the growing availability of weapons and the worsening of the conflicts in northern Uganda and in pastoralist communities in eastern Uganda (Figure 2). This trend was

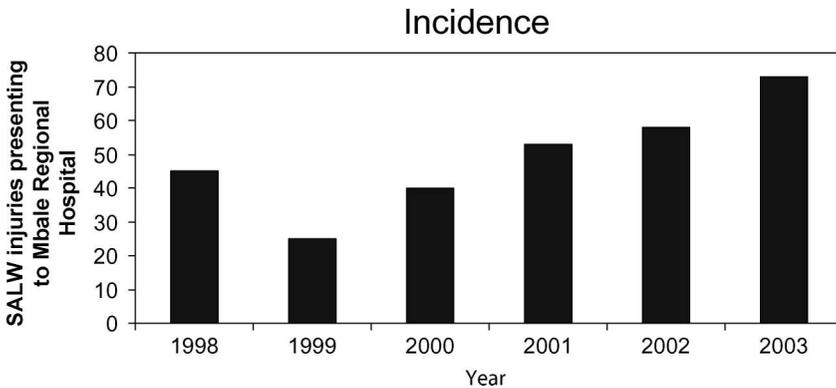


Figure 2. Incidence of injuries due to SALW in Mbale Regional Hospital.

consistent with data from the Casualty Department records that showed a similar number of cases being brought to their department. Unfortunately the records kept were insufficient to provide information such as the number of patients with injuries due to SALW who were admitted, died or were discharged. The trend of increasing incidence was also concurrent with independent data collected by another researcher studying surgical patients. Injuries due to SALW represented two per cent of the average 2515 admissions per year to the surgical wards. Public health records of injuries showed that approximately 1915 injuries annually were identified in the region, and hence these 49 injuries due to SALW represent three per cent of all injuries.

The 206 charts reviewed revealed that 88 per cent of victims were male and had an average age of 31 years old (range: 1–70). More than 50 per cent did not record occupation, but of those that did, most belonged to lower socioeconomic groups, probably dependent on casual labour and odd jobs, who could ill afford to miss work or pay for health care expenses. Nearly all of the patients were from a village or town in the region and most injuries occurred in the catchment area of the hospital. About 35 per cent of cases were referred from a smaller centre where most received basic first aid treatment. Only a few cases received more extensive treatment such as debridement, oral antibiotics and splinting or casting of a fracture.

Details regarding the intent of the injury were recorded in 79 per cent of the cases reviewed. Of these, the vast majority were intentional injuries by one party on another, with only eight per cent recording an unintentional injury and only one case of intentional self-injury. Details about the perpetrator were recorded in 75 per cent of cases and usually indicated that the person was a complete stranger, a combatant or a member of the security forces. A weapon was identified in only one out of 206 cases. Approximately 40 per cent of the injuries occurred in the context of an assault or robbery and 23 per cent occurred during armed conflict (Table I). The sub-group in this table shows that Mbale Regional Hospital received mainly those injured in the pastoralist conflict on the eastern border (88 per cent) but very few northern conflict victims. Most injuries occurred near or in the home or in the street or highway.

Fractures occurred in over 50 per cent of cases and significant organ damage in 20 per cent. Most victims presenting to hospital had injuries to their extremities or chest region. Approximately 66 per cent of patients had more than one injury, most commonly lacerations, fractures and internal organ injury in 11 per cent of cases. The average number of surgical procedures per patient was 1.3. The average length of stay was 14 days (range 0–100). Table II shows the final outcome as recorded in the patient charts. The unusually low number of deaths in hospital may reflect the high mortality of injuries due to SALW before the victims reach hospital so that

Table I. Context of injuries due to SALW.

	Number	%
Unknown	51	25
Armed conflict	47	23
Physical assault	48	23
Robbery	35	17
Accidental	14	7
Other	11	5
Sexual assault	0	0
Suicide	0	0
Abduction	0	0
Other crime	0	0
	206	
<i>Armed conflict</i>		
Karamoja/cattle rustling	41	87
LRA/northern conflict	5	11
Other	1	2

Table II. Outcome of injuries due to SALW.

	Number	%
Discharged home	163	77
Transferred	17	8
Died in hospital	17	8
Runaway	5	2
Unknown	4	2
In hospital	0	0
	206	

only relatively ‘well’ patients were analysed in this study. The vast majority were discharged home; only eight per cent died in hospital.

Amongst the patients in the public hospital, victims paid on average 104,000 USH (US\$58) out of pocket for medications, dressings and radiographs. Based on the average length of stay, each victim cost the hospital 373,000 USH (US\$207) for nursing care and their stay in hospital. Surgical costs per patient amounted to 33,500 USH (US\$19). Hence the average direct total cost per victim was approximately 510,500 USH (US\$284), approximately 80 per cent of which is paid for by the government. This is comparable to the average cost, out of pocket, per patient in the private hospital wing of 634,647 USH (US\$353), which includes a profit for the hospital. If there are approximately 50 cases presenting to Mbale Regional Hospital per year the direct costs of patients with injuries due to SALW would amount to at least US\$17,650 per year.

Discussion

Little information exists on the burden of disability from injuries due to SALW, especially in developing countries such as Uganda. This paper presents retrospective data from a six-year period of patients presenting to a regional hospital. It has been found that injuries due to SALW are increasing in incidence in the Mbale region of Uganda and are mostly related to assault and robbery or armed conflict in the region. These findings are similar to a study by the Injury Prevention Initiative for Africa (IPIFA) which looked at injuries due to SALW in the capital of Uganda, Kampala, and three hospitals in areas affected by the northern conflict with the LRA. In Kampala, an increasing incidence of fatal injuries due to SALW was found, as well as a gender ratio and incident profile similar to this study [1].

There are several limitations to this study that may affect its conclusions. As this was a retrospective study it is problematic to draw conclusions or make predictions from the findings. The incidence of injuries due to SALW was probably greatly underestimated. Many cases in the catchment region might not present to Mbale Regional Hospital or any other healthcare facility. One study from Ghana noted that only 31 per cent of persons with fatal injuries received any medical treatment at all, and only 51 per cent of persons with non-fatal injuries in rural regions received care at a hospital or clinic [45]. This would also explain the surprisingly low mortality rate of only eight per cent of patients with injuries due to SALW at Mbale Regional Hospital. It was hoped that data would be obtained from local mortuaries, police stations and other hospitals nearby to provide a better understanding of injuries due to SALW, but no such information was available and no coroner or mortuary functions in eastern Uganda. In addition, poor record keeping, improper coding and labelling and lost, illegible and incomplete records have probably further decreased the incidence presented here. It is possible that a large proportion of the 25 per cent of cases where no record could be found were those who died in hospital and hence a record was not kept. There were also significant difficulties in categorising cases analysed into 'armed conflict' versus 'assault'. Assault and robbery often occur as part of long-standing armed conflict such as that which exists in both the northern Ugandan conflict and in the pastoralist conflict on the eastern border. It is also possible that victims from the pastoralist community may have been reluctant to present to Mbale Regional Hospital due to long-standing racist treatment. On the other hand, there may have been some bias against the LRA and over-reporting of the details of these situations. The calculation of the cost of health care, or direct costs, were only estimates and did not include all possible expenses and overheads.

Injuries due to SALW are a significant burden, socially and economically, in eastern Uganda. This study has attempted to measure the direct costs of each injury due to SALW, showing that health care costs are quite significant for both the patient, who is usually from a lower SES group,

and the government, which has inadequate resources to meet the healthcare needs of the population. It is very difficult to estimate the true incidence of SALW in this region from this study. An average of 50 cases per year presented to Mbale Regional Hospital, but this probably only represents 40 per cent of all cases. Based on the population of the catchment region, this gives a prevalence of injuries due to SALW of 4.2 per 100,000 population, comparable to the IPIFA study which found an incidence of 4.5 per 100,000 in Lacor and 11.5 per 100,000 in Kampala [1, and Mutto M, *Small arms and light weapons in Uganda*, 2004, unpublished]. Averaging these incidence rates and extrapolating to the entire population suggests that there are at least 1470 injuries due to SALW per year in Uganda.

If the direct costs were 510,500 USH (US\$284) per victim receiving health care in the public system, this equals a minimum total direct cost to Uganda for injuries due to SALW of 750 million USH (US\$416,666) per year. As noted above, this is probably a significant underestimate as it does not include hotel costs or other missed overhead expenses, personal costs such as the expense of food or other amenities while in hospital, the cost of those patients receiving care in smaller health facilities, nor the cost of rehabilitation. It is vital to understand these direct costs to the patient in the context of poverty. For most victims the out-of-pocket costs of care of US\$58 is more than several months salary and hence a significant burden. It was also found that approximately 80 per cent of these direct costs are borne by the government, comparable to the impact of interpersonal violence in Jamaica, where 90–94 per cent of the cost of managing trauma victims was borne by the taxpayer [46].

In addition, the indirect costs, including lost days of work, long-term disability and the psychological burden of these injuries are probably far greater than the direct effects [1]. Very little research exists on quantifying the indirect costs of injuries. An economic theory has proposed that direct medical costs represent only 23 per cent of the overall costs of injury [47]; this study would then indicate a total cost per SALW injury of 2,219,565 USH (US\$1233), implying that these injuries cost the Ugandan people 3.26 billion USH (US\$1.8 million) per year. This can be compared to the total budgeted health care spending per person per year of US\$18 in Uganda in 2002 [48].

These calculated costs highlight the importance of prevention as a cost-effective solution. While there are many potential approaches to prevention, limiting the ‘vector’ of disease – SALW – is one key aspect of any solution to this problem [13]. In this study, although scant details were available on the weapons used in each incident, leftover military firearms are suspected to have been used in most cases [8,34]. The IPIFA study was able to obtain information on the type of weapon used in many circumstances, and found that 84 per cent of injuries involved assault rifles, such as those used by armed forces. Understanding the root causes of the proliferation of SALW, including social and economic driving forces, can help diminish the flow

into the region and distinguish 'causes' from 'agents' of proliferation [1: p 134; 34]. For an accurate assessment of the problem it is important to study political violence and the context around death and injury and face the challenge of connecting human rights movements with health researchers [24]. Violent conflict is driven by politics and economics, and context is crucial. It is equally important to listen to the voices of those most affected and to understand how these groups cope with violence in their communities [49].

Continuous and detailed monitoring of injuries and costs can help with planning and evaluating interventions [23,50]. While various prevention programmes with interpersonal violence have been attempted, they have not been well evaluated [51]. The health sector can contribute to peace by describing the problem and focusing limited resources towards interventions that demonstrate benefit [49]. Evaluation is crucial, as is developing an evidence base, removing blame, multi-level involvement and promoting an understanding of injury causation amongst health professionals [52]. More research is needed to understand the psychological, social and environmental factors that lead someone to harm someone else [51].

This study was an attempt to document the effects of SALW. It is hoped that this information will assist with advocacy campaigns for limiting the use and spread of SALW. Such information is only part of a movement that includes addressing all levels of government, challenging external bodies and corporations to act responsibly, and engaging the energy and creativity of the public. In addition, this work will hopefully form the basis of a long-term continuous injury surveillance project in eastern Uganda. Public health has a role to play in violence prevention, including changing behaviour and social and environmental forces and bringing to bear a multidisciplinary and scientific approach [53].

Contributors

AD Pinto assisted with designing the study, collecting and analysing the data and preparing the manuscript. P Olupot-Olupot assisted with designing the study, collecting the data and preparing the manuscript. VR Neufeld assisted with designing the study and preparing the manuscript.

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