

Wounds Caused by Firearms in El Salvador, 2003–2004: Epidemiological Issues

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Introduction

The 12-year civil war in El Salvador left a long-term legacy that still effects the health and welfare of its people. The economic impact of the war has left the country's GDP almost half of what it might have been had the war not taken place.¹ Hundreds of thousands of weapons were distributed throughout the country, many of which remain despite gun amnesties. Rates of homicide increased during the early 1990s to nearly 150 per 100,000 and although these rates, the second highest in the Americas, are reducing, gun crimes account for 70 per cent of homicides.

There are three government entities that collect homicide data, the Attorney-General, the National Civilian Police (PNC) and the Institute of Legal Medicine (IML), which report homicide rates of 56.6, 37.3, and 42.9 per 100,000 respectively for the year 2000.² Information on non-fatal injuries is less good; in reports to police from hospitals 864 people were reported as injured through wounds caused by firearms (WFA) compared to 2,000 who had died between June 2000 and April 2001. 80 per cent did not report to the authorities.³

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In 2003 the United Nations Development Program (UNDP) estimated that 12 per cent of El Salvador's GDP was spent on issues of violence or their sequela.⁴ There is a strong sense that violence still permeates the culture, with three driving factors:⁵

- . a culture of violence itself, particularly within youth culture and gangs;
- . the lack of effective and systematic controls through the appropriate social institutions; and
- . the easy availability and abuse of drugs and alcohol.

Health services in El Salvador are relatively well supported, accounting for 8.8 per cent of GDP.⁴ However, unusually for a middle income country, over 50 per cent of health care spending has been within the private sector over the last five years.⁶

It is against this background, with violence still posing a significant problem to the health of society and WFA placing a significant drain on resources, that Me´dicos Salvadore˜nos para la Responsabilidad Social (MESARES is the IPPNW affiliate in El Salvador) set out to study and define the problems more closely. The aims are to clarify the epidemiological data, to identify provoking and associated factors to gun violence and to develop a programme of recommendations for policy development. The first study looked at WFA in children through a retrospective analysis of case notes at specialist children’s hospitals from January 1999 to September 2001.^{7,8} There was an annual average of 33 cases, which is high compared to neighbouring countries such as Mexico, where the corresponding figure in a specialist hospital is 69 WFA over 15 years. The total costs of surgery and intensive care were nearly US\$300,000; 22 per cent of the children were permanently disabled. The majority of case notes gave no information about the circumstances of the injuries. A second retrospective study of adult case notes also revealed a lack of useful data on the circumstances and the victim. Recommendations from these studies included tougher laws on civilian gun carrying and ownership, a nationwide collection of information from firearm injury cases and the inclusion of the topic in teaching at medical schools.

A public health approach that considers prevention depends on data about the nature of events and the characteristics of those most susceptible. This has led to this present study to look prospectively at 100 admissions to a tertiary hospital in San Salvador.

Methods

There are three elements to the study. First is a review of statistical information on deaths caused by firearms (WFA) in El Salvador, using the National Death files of the Institute of Legal Medicine, which routinely gathers data on homicides from all hospitals. The second element is the 192 I. PANIAGUA, E. CRESPIAN, A. GUARDADO AND A. MAURICIO morbidity and mortality of patients admitted with WFA to a tertiary level public hospital in San Salvador. For this data was gathered by the research team from the daily registration forms for general and emergency services for death and wounds by firearms, which were kept routinely by the hospital during the study period. The team also reviewed the principal, secondary and other diagnoses using ICD10 clinical criteria.

The third element is a prospective study of 100 cases admitted with WFA between June 2003 and May 2004 to the tertiary hospital. For this study data was collected by a team of six researchers trained in the field using a survey form, which had been piloted on 20 patients with WFA. This work was supervised by the authors. The study covered the following domains:

- . socio-cultural status of the victim;
- . demographic data of the victim, such as age and sex;

- . status of the victim's family;
- . circumstances of the event;
- . cost to the health services.

The 100 cases were selected according to the presence of the research personnel in the hospital. They were patients admitted to the hospital over the age of 13 years for whom consent was obtained to be involved in the research: for patients aged 13–18 years consent was obtained from parents. Those with additional diagnoses complicating the admission, those managed through outpatients and those who could not consent through coma or some other feature were excluded.

Information on the costs to the health services was taken from the administrative records kept by the hospital.

All data was entered into SPSS 11.5 for Windows and analysed using descriptive statistics.

Results

Deaths at a National Level

The Institute of Legal Medicine reported that in 2003 there were 2,388 deaths by violent homicide, giving a homicide rate of 36 per 100,000. Of these, 1,697 were from WFA, being 71 per cent of the total homicides. Fifty-eight per cent of the deaths by WFA in 2003 were aged between 15 and 29 years; the figures for 2002 were 2,346 and 1,654 respectively. In 2003, 30 per cent of homicides through WFA – 516 people – died in hospital and a quarter of these, 136, were admitted to the Hospital Rosales, the tertiary hospital in San Salvador where the study took place

Records from the Tertiary Hospital

In the study period, June 2003 to May 2004, 789 people sought emergency care for WFA, 623 were admitted and 133 died. This means that one in five WOUNDS FROM FIREARMS IN EL SALVADOR 193 of those admitted died of their wounds. Sixty per cent of those seeking emergency treatment were aged 25 years or under and less than ten per cent were over 40 years. Ninety-two per cent were male.

From 1 January to 31 December 2003 the hospital records showed that 668 patients with WFA attended the hospital, 569 were admitted and 117 were recorded as dying from WFA, a similar 1:5 ratio of deaths to admissions. This group of patients occupied 4,495 bed days during the year. This information is used to extrapolate costs (see below).

It is worth noting that from the Rosales Hospital records in 2003, 117 people died, compared to the records from the Institute of Legal Medicine which recorded 136 deaths. When the study team reviewed the ICD10 coding they reported almost the same figure as the Institute of Legal Medicine. This demonstrates the problems of registration and accurate record keeping within ordinary hospital work.

Description of the 100 Admissions

The data is reported in raw numbers, which may be considered as percentages. There were 85 patients aged 30 or under; 91 were men; 67 were Christian; 62 were single; 64 lived in San Salvador, the capital. Half stated that they came from stable backgrounds, whilst 28 lived with only one head of the family and 22 lived with relatives other than a parent. The average family size for the group was 4.8 members compared to the national average of 4.4.

Fifty-nine reported that they did not depend economically on their parents and 53 had responsibilities to family members, 25 having three or more persons financially dependent on them. Sixty-seven did not know about their family income and only ten families had slightly more than the minimum income. At a personal level more than half earned less than US\$100 a month and only 23 earned the minimum salary of UD\$160 a month.

Sixty-two had studied higher than the sixth grade, whilst 27 had completed High School and six per cent had been to university. Eleven had no education. In their leisure-time 48 said they practised sports, 33 said they visited leisure centres, 30 reported being members of a sports club or religious group and 12 said they were members of a gang.

TABLE 1
PREVIOUS INVOLVEMENT IN VIOLENCE OF THE 100 CASES

Crime	Exposure	Perpetrators	Arrested
Violence in family	32	22	3
Conflicts	36	21	3
Gang fights	53	26	8
Muggings	67	36	10
Murder	18	8	8
Rape and kidnapping	4	2	3

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Their socio-economic situation was evaluated according to access to five basic services: drinking water, home energy, waste collection, street lighting and a sewer system. Sixty reported access to all five, 11 had access to four, 14 had access to one or two, whilst six had no access to basic services. This placed the group better than the national average.

Previous exposure to social risk behaviours showed that 77 had been unintentionally involved in muggings as a victim, whilst 53 reported being unintentionally caught up in gang fights. Thirty-eight reported being intentionally involved in muggings and 26 in gang fights. Eight people admitted active involvement in murders, 18 to some involvement and eight had been arrested for these crimes. Four people admitted involvement in

other crimes such as kidnapping and rape. Violence in the family had been experienced by 23 and carried out by 22.

Sixteen admitted they had owned a gun before the injury and 18 said they would like to possess a firearm for protection or for vengeance. The context of the event was looked at in respect of time, place, the relationship to attacker and contributing factors. Seventy-one events took place in the urban area of San Salvador; Saturday had twice the number of events as the other days; January and July were the commonest months.

Twenty-two admitted knowing the offender whilst 29 reported the motive was personal conflict; 35 reported that crime was involved whilst 20 did not know, and five said it was 'lost bullets', in other words incidental to some other shooting.

The firearm used was a pistol in 50 of the occasions; 80 reported that the weapon was commercial and three mentioned a craft weapon. Two-thirds of the patients were injured whilst travelling, walking or waiting for a bus, 11 at work and ten at leisure; 86 were attacked on the street and five in a public transport vehicle. In response to the attack 90 of the patients either did nothing or tried to run. Twenty-two admitted being under the influence of alcohol at the time of the incident. Use of drugs was often admitted to outside the time of the injury, with 87 having used drugs or alcohol over the previous five years, including marijuana in 16, cocaine in 13 and crack in nine cases.

Among clinical features of the injuries, 25 patients were hit with more than three bullets, suggesting an expression of rage in the attack. A 9mmcalibre weapon inflicted half the wounds, and small arms were the most common weapons used rather than the heavier weapons used by the army. The commonest areas injured in the 100 study cases were the limbs, then the chest and abdomen, and then the head and neck areas, but this was related to survival. The commonest area of injury for all patients admitted with WFA was limbs, abdomen, head and neck, multiples sites, chest and pelvis, suggesting that head and neck injuries have a lower chance of survival. Eleven patients reported being beaten up at the time of the attack or cut with a blade, another suggestion of rage.

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Costs of WFA

One hundred files were reviewed for costs. These one hundred patients accounted for 1,482 bed-days with a total hospital bill of US\$308,445.46. The cost per admission averaged US\$3,084.45; the cost per day was US\$208.13. Extrapolating over the 569 admissions to the hospital in 2003, the costs for the hospital would be US\$1,755,052.00 per year, 10.58 per cent of the total hospital budget.

The Institute of Legal Medicine reports that in 2003 516 people died of WFA in hospitals. Using the one to five ratio of deaths to admissions seen in this study gives a total number of admissions nationally as 2,580. Of these approximately 180 were in the private sector therefore costs to the national health services can be estimated in the region of US\$7,402,680, with 2,400 admissions to public hospitals costing on average US\$3,084.45.

An economic theory has been proposed that relates the ratio of medical costs to total social costs, including economic loss through unemployment and disability.⁹ In this model the medical costs of trauma and injury account for 23 per cent of the full social costs. Using this formula for the 2,580 estimated admissions to all sectors, the morbidity associated with WFA represents a US\$34 million drain on the total economy.

Discussion

This is a prospective study based on interviewing patients in hospital, and is therefore reliant on the accounts of those wounded rather than any direct observations of their lives and of the events. There is also the question as to how representative the 100 patients interviewed are of the total with WFA and whether the costs at the tertiary hospital are representative of costs elsewhere. However the study does collect useful information and gives a good indicator as to what data should be collected routinely. It also allows an analysis of the events, the people involved, the impact on health services and some broad estimates of costs.

The study shows that violence by firearms exerts a deep impact on people's health and on the family budget. The national hospital network cared for 30.4 per cent of homicides caused by WFA whilst the Rosales Public National Hospital, the tertiary hospital in this study, cared for 26 per cent of this group. Due to the high lethality of WFA the majority do not even reach hospital emergency rooms. The mortality in hospital is high, with over 20 per cent dying after admission. Extrapolating to national level results suggest 2,580 patients with WFA needing hospital care in 2003. This study establishes the following victim profile: a young man, at his most productive age, living in an urban centre, a member of a group of unemployed or underemployed people in difficult economic conditions but contributing to the support of his family, which often has more than five

members. The victims are young men who have reached some level of formal education above sixth grade. They are aware of their social context and unsure of their future, and reside in a violent area with low social capital. Drugs, alcohol and firearms are part of their daily lives and they are exposed to or participate in muggings and street fights, related either to gangs or personal conflict.

Most WFA attacks occur on the public street and their occurrence is related to factors such as the sale and consumption of drugs and alcohol, the day of the week and the time, especially Saturday nights, and holidays in specific months. Such attacks on the public street show that small arms carried by civilians in public areas contribute to a considerable demand on hospital care, human suffering and social costs.

This study has led to several recommendations: to control access to and possession of firearms; to target some of the aggravating factors such as drugs and alcohol; to increase public awareness of the risks; to tackle the culture of violence through educational programmes; to develop more research in other areas of the country; and establish regular monitoring and surveillance of WFA, combining data from different sources. WFA create a significant drain on society in many ways and should therefore remain the focus of attention at national and international levels.

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MESARES (Salvadoran Physicians for Social Responsibility) was founded in 1989. MESARES has developed a programme to educate physicians, health workers and students, mobilising health resources at a national level and taking active part in regional movements against small arms proliferation, misuse and the impact on human suffering.

E-MESARES (Salvadoran Medical Students for Social Responsibility) was created as a Medical Student Chapter of IPPNW in 2001 to involve medical students in education about peace, prevention of conflict and war. E-MESARES participated in the World Congress of IPPNW in Washington, DC presenting their activities. They have been working against small arms proliferation and misuse and also campaign on human rights, ethics and HIV/AIDS.

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