Increasing incidence of nonlethal inflicted injuries in paediatric homicides: A 45-year study

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ABSTRACT

A retrospective study was undertaken at Forensic Science South Australia of all homicides in individuals aged < 18 years from January 1970 to December 2014. 166 cases were identified (M:F = 1.5:1). The number of cases steadily declined, with the highest numbers and death rate occurring between 1970 and 1974 (N = 26; 0.37/100,000 population), and the lowest between 2010 and 2014 (N = 8; 0.1/100,000) (p < 0.01). Deaths were due to blunt force trauma (37%), gunshot wounds (19%), asphyxiation (18%), sharp force trauma (8%), poisoning (8%), burns (3%) and neglect (1%), or were undetermined (6%). There was a significant increase in numbers of accompanying nonfatal injuries (3.46 per case for 1970 and 1974, compared to 18.88 per case for 2010 and 2014). Thus, while both the absolute numbers and the rates of paediatric homicides declined significantly, numbers of nonlethal injuries increased. Whatever the underlying reason(s) for the increase in nonlethal injuries, fatal attacks on children in South Australia appear to be becoming more violent.

1. Introduction

Lethal inflicted injury in childhood is an ongoing problem in many communities. For example, in 2000–2001 it was estimated that between 896,000 and 903,000 children in the United States (US) had been abused, a rate of approximately 12.3/1000 children.[1,2] Homicide was the second leading cause of death in children aged from one to 19 years, accounting for 2478 cases (12.1% of all deaths) in 2010, decreasing to 2304 cases (11.4% of deaths) in 2011.[3] 1500 deaths due to maltreatment were reported in 2016.[4]

The patterns of inflicted injury in these cases vary with the age of a child. For example, homicides in very young children who are unable to defend themselves tend to involve suffocation and blunt force injuries, in addition to neglect and starvation.[5] Homicide rates tend to be highest in the first year of life in studies from many different communities, with deaths most often resulting from intracranial injuries.[6–10]

The assailant in these cases is usually a parent or carer who is impulsively punishing the child.[11,12] Studies from Taiwan, France and Australia have also implicated perpetrators who either knew, or were looking after, the victim.[13–15] This contrasts with adolescents who have more of an adult pattern of assault involving stabbing, shooting and blunt trauma, often arising from an altercation, or during a robbery or drug/gang-related activity.[9,16,17]

There are also marked differences in homicide rates among different communities and countries with, for example, the US having the highest number of homicide deaths in males aged from 13 to 19 years at 13/100,000 of the population. This compares to much lower rates in Australia and Canada of 2.5/100,000, followed by England and Wales, the Netherlands, Sweden, Japan and France, all with less than 0.5–0.6/100,000 deaths.[5,14]

Given that the incidence and nature of homicides may change over time, the following study was undertaken in an attempt to evaluate the profile of paediatric homicides in a single community over a number of decades.

2. Materials and methods

A retrospective study was undertaken of autopsy files at Forensic Science SA of all homicides occurring in the state in individuals aged under 18 years over a 45-year period from January 1970 to December 2014, to determine whether there had been any changes in the numbers, causes and nature of these deaths. South Australia is a state in the south central part of Australia with a current population of approximately 1.7 million. All paediatric homicide autopsies over this period were conducted by forensic pathologists at the bequest of the State Coroner. All cases were the subject of full police investigations.

The year of death, sex, and age (infants < 12 months; children 1 to < 13 years; and teenagers 13 to < 18 years) were tabulated along

with the cause of death. Causes of death were listed as blunt force trauma, gunshot wounds, asphyxiation/drowning, sharp force trauma, poisoning, burns, neglect and undetermined. The anatomical locations of the lethal injuries were recorded. The numbers of recent associated nonfatal injuries (i.e. nonlethal bruises, abrasions, lacerations, fractures, and sharp force injuries) were also tabulated over time, in addition to the numbers of fatal injuries and remote nonfatal injuries. Statistical analyses were conducted using a Spearman's rank coefficient correlation test (r) with a two-tailed p-value (significance taken at p < 0.05) using GraphPad Prism 6.08 (GraphPad® Software Inc., San Diego CA USA). Ethical approval for this study was given by the management of Forensic Science South Australia.

3. Results

A total of 166 cases occurred between 1970 and 2014 with 99 males and 67 females (M:F = 1.5:1). Forty-four cases were infants - < 1 year (27%), 75 were children (1 to < 13 years) (45%) and 47 were teenagers (13 to < 18 years) (28%). The number of cases steadily declined over the 45 years of the study, with the highest number and rate of deaths occurring in the five-year period 1970–1974 (N = 26; 0.37/100,000 population) and the lowest between 2010 and 2014 (N = 8; 0.1/ 100,000) (r = −0.81; p < .01) (Figs. 1 and 2).

Deaths were due to blunt force trauma (37%), gunshot wounds (19%), asphyxiation (18%), sharp force trauma (8%), poisoning (8%), burns (3%) and neglect (1%), or were undetermined (6%). The undetermined group consisted of a small number of infants with hypoxic ischaemic encephalopathy of unknown cause and the remainder of skeletonized remains (a number of whom were victims of the same serial killer who buried the bodies of his victims in an isolated part of the state). In the period 1970 to 1974 the most common causes of death were blunt force trauma followed by gunshot wounds, asphyxia and poisoning. While blunt force trauma was still the predominant cause of death in the period 2009–2014, this was followed by asphyxia and sharp force trauma, and then poisoning, burns and finally gunshot wounds. Thus, analyses over time show a significant trend for reduction in deaths due to both blunt force trauma (r −0.73, p = 0.02) and

gunshot wounds (r −0.76, p = 0.01). Poisonings increased over time (r 0.78, p = 0.01), with no significant temporal changes in numbers of deaths due to sharp force trauma, asphyxiation, burns, or neglect. Injuries to the head, face and neck accounted for 63% of fatal injuries, with 32% to the torso, 3% to the anogenital region and 2% to the limbs.

In looking at the numbers of recent accompanying nonfatal bruises, abrasions, lacerations, fractures, and sharp force injuries there was a significant increase over the time period of the study (Fig. 3). Specifically, the number of nonfatal injuries averaged 3.46 per case between 1970 and 1974, compared to 2010–2014, when there was an average number of 18.88 per case (p < 0.05). The majority (85.6%) of recent inflicted nonfatal injuries were due to blunt force trauma involving the limbs, followed by sharp force trauma (13.3%). No significant increase over time was demonstrated in fatal and remote non-fatal injuries.

4. Discussion

Violent crimes in Australia declined between 2003 and 2013 with the total number of homicides decreasing by 20%.[18] In fact, the homicide rate in 2014 in Australia was at a five-year low, with only 1.8 victims per 100,000 people.[19] Similarly, the homicide rate in adolescents in the US in 2010 at 8.3/100,000 was the lowest since before 1980.[17] The reported rates of both physical and sexual abuse in children have declined since the 1990's in both the US and England.[20]

This trend was also reflected in the present study with a significant and steady reduction in numbers of paediatric homicide cases over the 45-year period; the highest number of deaths occurred in the five-year period 1970–1974 (N = 26; 0.37/100,000 population), compared to the lowest number of deaths between 2010 and 2014 (N = 8; 0.1/ 100,000) (r −0.81; p < 0.01). Of note, this decrease was predominantly due to a significant reduction in deaths from blunt force trauma (r −0.73, p = 0.02) and gunshot wounds (r −0.76, p = 0.01). Although numbers of lethal inflicted poisonings increased over time (r 0.78, p = 0.01), these numbers were small. No significant temporal changes in numbers of deaths due to sharp force trauma, asphyxiation/ drowning, burns, or neglect occurred.

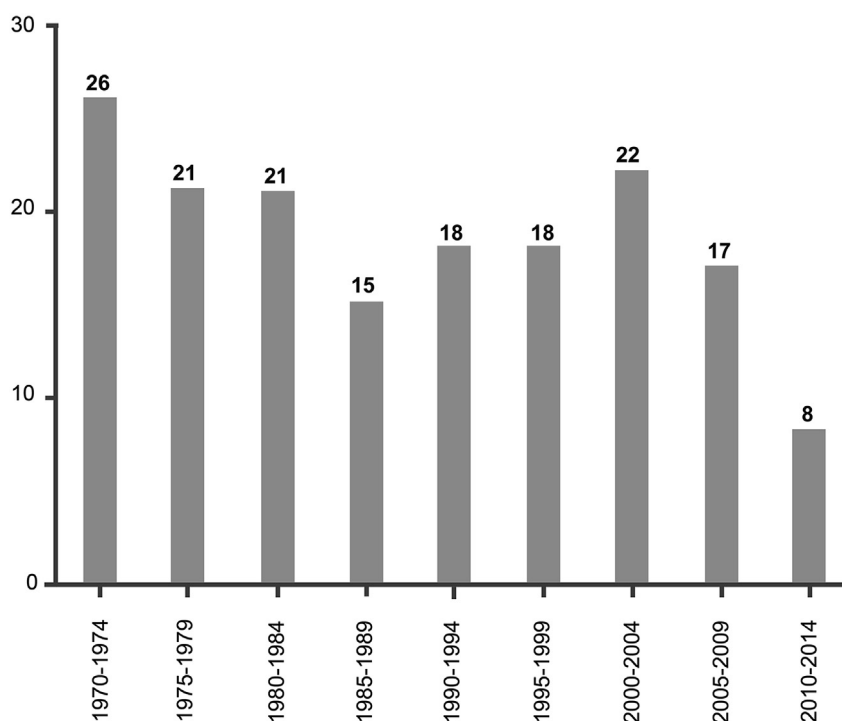Methods of assault vary among different populations, with a study

Fig. 1. Numbers of paediatric homicides in South Australia from 1970 to 2014 grouped into five-year periods.