Original article

Medicine, Science and the Law
2014, Vol. 54(2) 74–77

DOI: 10.1177/0025802413491249
msl.sagepub.com

Study on unnatural childhood deaths presented to North Colombo Teaching Hospital, Sri Lanka

Indira D Kitulwatte[1] and PAS Edirisinghe[1]

Abstract

Introduction: Unnatural childhood deaths are not only associated with intense trauma and separation distress, but also relate to a sense of neglect to protect children from harm. Accurate information on causes and circumstances of such deaths through a process of medico-legal investigations is essential in creating an awareness among the policy makers and educators/caregivers, to prevent these tragic deaths.

Objective: The aim of the study was to determine the causes and the circumstances of unnatural deaths of children among the medico-legal autopsy population presented to North Colombo Teaching Hospital, Sri Lanka.

Study design: A retrospective descriptive study was carried out based on Reports of Postmortem Examination performed in a Tertiary Care Hospital, on children who died of unnatural causes during the period from 2009 to 2011.

Results: Out of 48 unnatural childhood deaths, 24 (50%) children were older than 10 years of age. The most frequent circumstance of death was accidental 39 (81%), while the most frequent cause of death was drowning 16 (33%). Fifteen died due to accidental drowning while one was a homicidal drowning. Suicidal deaths were found only among the children older than 16 years of age. Fifty-four percent of the accidental deaths had taken place at or around the home.

Conclusion: Accidents accounted for the majority (or greatest number) of tragic childhood deaths. The presence of drowning as the most common cause of death indicates that an immense responsibility lies with the parents and caregivers to prevent such deaths.

Keywords

accidents, children, drowning, unnatural deaths

Introduction

The unnatural death of a child can be attributed not only to intense trauma and separation distress, but can also be associated with a sense of negligence in protecting the child from harm. Injury is found increasingly among children as a cause of death.[1] Deaths as a result of injury accounted for 28% of childhood deaths in New York City between 2001 and 2009.[2] In many parts of the world, accidents, especially traffic accidents are the leading killers of young people.[3] Accidents accounted for 69% of all childhood injury deaths in New York City between the years of 2001 and 2009 and 41% of these were transportation related.[2]

Intentional injuries (homicides/suicides) were responsible for 25% of all childhood injury and poisoning deaths in England and Wales in 1995.[4] Most unnatural deaths of children can be prevented with a proper public understanding of their nature and frequency. Comprehensive medico-legal investigations into such deaths can provide essential information to create awareness among the general public as well as with policy makers and administrators of justice.

In Sri Lanka, persons under the age of 18 years are classified as children. With regard to the total number of suicides reported to the Coroner in Colombo, Sri Lanka, 13.2% of persons were listed as being under the age of 19 years.[5] In 2005, a total of 2304 road fatalities were reported; however, data on age-specific fatalities are not available.[6] According to the Department of Census and Statistics of Sri Lanka, in 2006, 197 persons under the age of 19 years died in transport accidents while 260 died due to accidental drowning and submersion. Three hundred forty-one

[1]Department of Forensic Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka

Corresponding author:
Indira Kitulwatte, Department of Forensic Medicine, Faculty of Medicine, Ragama, Sri Lanka.
Email: indiradgk@yahoo.com

cases of death by intentional self-harm were recorded in this age group while 31 deaths were due to assault. When considering the children's death from each category of unnatural deaths, the percentages varied between 2 and 15%, but in accidental drowning 31% were children. (In Sri Lanka, a total of 865 deaths occurred as a result of accidental drowning and submersion: 260 of these deaths were in persons under the age of 19 years.)[7]

Data about causes, circumstances and distribution of childhood deaths vary from country to country and, therefore it is essential to review the patterns in our own country to suggest more effective precautions/preventive measures.

Objective

The aim of the study was to determine the causes and circumstances of unnatural deaths of children among the medico-legal autopsy population in Teaching Hospital Colombo North, Sri Lanka, from 2009 to 2011.

Study design

A retrospective descriptive study was done based on Reports of Postmortem examination performed in Teaching Hospital Colombo North, Sri Lanka, a Tertiary Care Hospital. This study was based on reports from deaths of children who died of unnatural causes during the years 2009–2011. Persons under the age of 18 years were considered as children according to the legal definition. Neonatal deaths associated with complications of birth asphyxia were excluded from the study. The information was gathered on a proforma to fulfill the study objectives. For the purpose of analysis, the children were grouped according to their age considering their developmental maturity. The data were analyzed using SPSS statistical package with percentages and significance using chi-squire test.

Results

Out of the 48 unnatural deaths, 39 were due to accident (81%), six were suicides (13%) and three were homicides (6%). The most common cause of death was drowning with 16 (33%) cases which included 15 cases of accident and one case of homicide. Blunt head trauma due to road accidents accounted for nine of the 48 unnatural deaths (19%) and was placed as second for the cause of death. Of the 48 unnatural deaths, 24 (50%) of the decedents were more than 10 years of age. Of the 24 deaths, 18 (75%) were due to accident and six (25%) were due to suicide. There were three homicides among the children less than 10 years of age (Table 1). When further analyzing the three victims of homicide, it is found that two were infants and one child was a preschooler (between two and five years). All of the suicidal deaths were found among the group of late adolescent children that ranged in age from 16 to 18 years of age. Of the six suicides, five were cases of hanging (83%) and one (17%) was due to ingestion of a poison. Homicidal deaths were due to drowning, blunt head injuries and sharp force trauma, each with one case.

Table 1. Circumstances according to the age group.

Age group	*N*		*N*	Percentage (%)
0–10 years	24	Accidents	21	87
		Homicides	3	13
		Suicides	0	0
11–18 years	24	Accidents	18	75
		Homicides	0	0
		Suicides	6	25

Table 2. Accidental causes of death.

Causes	*N*	Percentage (%)
Drowning	15	39
RTA	11	28
Aspiration-related choking	7	18
Other	6	15
Total	39	100

Table 3. Age distribution of accidental drowning incidents.

Age group	*N*	Percentage (%)
<1 year (infants)	1	6.3
1–2 years (toddlers)	1	6.3
3–5 years (preschool)	3	20
6–10 years (primary school)	1	6.3
11–15 years	5	33
16–18 years	4	27

The 39 accidental deaths broke down this way: there were 15 cases of drowning (39%), 11 road accidents (28%) which included nine cases of blunt head trauma and two cases of blunt trauma to chest and abdomen. There were seven aspiration-related deaths (18%) where infants had choked on aspirated stomach contents and six other deaths (15%) among which were a case of traumatic asphyxia, choking, accidental poisoning, burns, snake bite, and a case of sharp force trauma (Table 2).

Out of the 15 accidental drowning incidents, five (33%) were of the age group of 10–15 years followed by four (27%) children of 16–18 years age group who are much independent late adolescents. There were three drowning deaths (20%) among the children of two to five years who were preschoolers needing close adult supervision (Table 3).

Out of 16 cases of drowning, seven incidents including the one of homicide had occurred in or

around the home. The other nine cases of accidental drowning took place in other areas, including rivers and the sea. The victims of these nine incidents of drowning were all children aged 11–18 years.

Mechanical asphyxia was the mechanism of death in majority 30 (62%) cases while there were nine (19%) cases of blunt head trauma. The victims of mechanical asphyxia included 16 (54%) cases of drowning, seven (23%) cases of aspiration associated choking, five cases (17%) of hanging and one (3%) each of choking and traumatic asphyxia.

Discussion

Over 1.5 million people die from preventable acts of violence every year.[8] Child victimization in such violence is on the rise.[9] The number and the pattern of tragic unnatural deaths of children vary from country to country. This study was planned to collect more information to get an insight into the extent of the problem in Colombo North, Sri Lanka, in order to suggest preventative measures.

The study revealed that 81% of the tragic childhood unnatural deaths reviewed were due to accidents with the commonest incident being reported as drowning. Various accidents are the leading cause of death in children worldwide and road accidents are identified as the number 1 killer followed by drowning.[3] According to World Health Organization (WHO) statistics, road traffic injuries were responsible for the highest injury mortality in 2002.[10] Between the years 2000 and 2006, fatal drowning remained the leading cause of death for children in South East Asia while it was the second-leading cause of accidental death in the United States for the children of the same age.[11,12]

This study involved a semi-urban area and a tertiary care hospital with no neuro-surgical facilities. Most victims of fatal road accidents who are admitted alive are transferred to the National Hospital prior to death for neuro-surgical management. Therefore, the true picture with regard to the causes of death in the study population is not represented here. Of note and something which cannot be ignored is the presence of the large number of cases with drowning as the main cause of death as well as the main *accidental* cause of death. Over 90% of the deaths from drowning occur in developing countries.[13] Three people in Sri Lanka die each day of drowning.[14] Young adults are often the victims in these tragic incidents.[14] When the detailed age distribution of the accidental drowning cases was analyzed, it was revealed that the majority were older children. Data from studies of different countries indicate that much younger children are at an increased risk of drowning.[15–18] The majority of drownings (56%) occurred in places other than home and vicinity. This indicates unsupervised exposure of these children to numerous water sources outside the vicinity of the home, including the ocean. There are a great number of natural and man-made interior water reservoirs in Sri Lanka and the country is completely surrounded by the ocean. The North Colombo Teaching Hospital is located in the coastal region. In Singapore, almost 60% of non-transport related fatalities take place in and around the home with most common cause being drowning.[19]

The study revealed that suicidal deaths were mainly found among the late adolescents or in children who are more than 16 years of age. The suicide rate in Sri Lanka is still high although there has been a decline since 1995.[20] Worldwide the trend of suicide among children is on the rise. The mean global suicide rate for 15–19 year olds is reported as 7.4 per 100,000 population.[21] According to a recent study, the suicide rate per 100,000 population among females of 10–19 years was 11.98, while it was 11.9 per 100,000 population among males of the same age in Sri Lanka by 2011.[22] The study revealed that the majority of children had selected hanging to terminate their lives. Hanging was the most common method of suicide in Canada for child victims of suicide between the ages of 10–19 years.[23,24] Thus, it was revealed that the children in the study group had also gone for hard suicide method like in other countries. In Sri Lanka, the most common overall method of suicide is pesticide poisoning.[5,20] Among the three homicides, two were infanticides. The risk of being a homicide victim is high among the infants.[25,26]

There is an equal distribution of unnatural deaths among the two age groups, less than 10 years of age and greater than 10 years of age. There was a significant difference in the circumstances when the two age groups were considered. This can be explained from the presence of suicides only among the older children. Unnatural deaths increase with age, since there is more violence expected in older children.[27] This further highlights the need for supervision of children as their age increases.

Conclusion

Further studies to cover the entire island are required to have an insight into the true picture of unnatural childhood deaths in Sri Lanka. With the findings of the present study, drowning is the most common cause of death. Accidents account for the majority of tragic unnatural childhood deaths. Relatively older children are at much higher risk of death from these accidents. This indicates that there is an immense responsibility for the parents and caregivers in supervising their children even if they are older.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

1. UNICEF. *A league table of child deaths by injury in rich nations. Innocenti Report Card (2)*. Florence, Italy: Innocenti Research Centre, UNICEF, 2001.
2. Fortin P, Stayton C, DiGrande L, et al. *Report from the New York City Child Fatality Review Team: understanding child injury deaths*. New York: New York City Department of Health and Mental Hygiene, 2011.
3. Toroyan T and Peden M (eds). *Youth and road safety*. Geneva: World Health Organization, www.who.int/violence_injury_prevention/publications (2007, accessed 16 May 2013).
4. Roberts I, Li L and Barker M. Trends in intentional injury deaths in children and teenagers (1980–1995). *J Publ Health Med* 1998; 20: 463–466.
5. Fernando R, Hewagama M, Priyangika WD, et al. Study of suicides reported to the Coroner in Colombo, Sri Lanka. *Med Sci Law* 2010; 50: 25–28.
6. Somasundaraswaran AK. Accident statistics in Sri Lanka. *IATSS Res* 2006; 30: 115–117.
7. Department of Census and Statistics of Sri Lanka. Vital statistics number of deaths according to cause by age and sex, http://www.statistics.gov.lk/PopHouSat/VitalStatistics/Tables.asp?Year=2006 (2006, accessed 19 August 2012).
8. World Health Organization. *Milestones in international road safety. World Health Day 2004 and beyond*. Geneva: WHO, 2005.
9. Finkelhor D and Dziuba-Leatherman J. Children as victims of violence: a national survey. *Pediatrics* 1994; 94: 413–420.
10. World Health Organization. *The injury chart book. A graphical overview of the global burden of injuries*. Geneva: WHO, 2002.
11. Linnan M, et al. Child mortality and injury in Asia: survey results and evidence. Florence: Innocenti Research Centre, UNICEF, http://www.unicef-irc.org/publications/pdf/iwp_2007_06.pdf (2007, accessed 21 January 2008). (Innocenti Working Paper 2007-06, Special Series on Child Injury No. 3).
12. Borse NN, Gilchrist J, Dellinger AM, et al. *CDC childhood injury report: patterns of unintentional injuries among 0-19 year olds in the United States, 2000–2006*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2008.
13. Hyder AA, Borse NN, Blum L, et al. Childhood drowning in low – and middle – income countries: urgent need for intervention trials. *J Paediatr Child Health* 2008; 44: 221–227.
14. Registrar Generals Office Sri Lanka. Statistics: 2003–2005, http://www.statistics.gov.lk (2010, accessed 16 May 2013).
15. Calder RA and Clay CY. Drowning in Florida 1977–1986. *J Flo Med Assoc* 1990; 77: 679–682.
16. Ellis AA and Trent RB. Hospitalizations for near drowning in California: incidence and costs. *Am J Public Health* 1995; 85: 1115–1118.
17. Wintemute GJ. Childhood drowning and near-drowning in the United States. *Am J Dis Child* 1990; 144: 663–669.
18. Rahman A, Giashuddin SM, Svanström L, et al. Drowning – a major but neglected child health problem in rural Bangladesh: implications for low income countries. *Int J Inj Contr Saf Promot* 2006; 13: 101–105.
19. Ju CA. Recent trend of deaths from unnatural causes (accidents, suicides and homicides) in Singapore 1961—1965. *Singapore Med J* 1969; 10: 72–84.
20. Gunnell D, Fernando R, Hewagama M, et al. The impact of pesticide regulations on suicide in Sri Lanka. *Int J Epidemiol* 2007; 36: 1235–1242.
21. Wasserman D, Qi C and Xin JG. Global suicide rate among young people aged 15–19. *World Psychiatry* 2006; 5: 39.
22. De Silva V, Hanwella R and Senanayake M. Age and sex specific suicide rates in Sri Lanka from 1995–2011. *SL J Psychiatry* 2012; 3: 7–11.
23. Shaw D, Fernandes JR and Rao C. Suicide in children and adolescents: a 10-year retrospective review. *Am J Forensic Med Pathol* 2005; 26: 309–315.
24. Schmidt P, Müller R and Madea B. Suicide in children, adolescents and young adults. *Forensic Sci Int* 2002; 127: 161–167.
25. Marks MN and Kumar R. Infanticide in England and Wales. *Med Sci Law* 1993; 33: 329–339.
26. Brookman F and Nolan J. The dark figure of infanticide in England and Wales: complexities of diagnosis. *J Interpers Violence* 2006; 21: 869–889.
27. Meel BL. Mortality of children in the Transkei region of South Africa. *Am J Forensic Med Pathol* 2003; 24: 141–147.