

PAEDIATRIC DEATHS AFTER INJURY AT KOMFO ANOKYE TEACHING HOSPITAL, KUMASI, GHANA

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SUMMARY

Injury constitutes a major health hazard worldwide and causes many deaths and many more cases of disability annually. This situation is said to be worse in developing countries, since most developed countries have put in place prevention strategies to minimize injury and especially deaths from injuries. In developing countries, accurate reporting of injury deaths is hindered by limited vital registry statistics. We decided to investigate childhood injury deaths, which were hitherto not found in the usual records such as the police records, birth and deaths registry, and even the hospital statistics. All children dying after injury and being delivered to the mortuary of Komfo Anokye Teaching Hospital (KATH) from 1996 to 2000 were analysed. A total of 233 children died during this period from the injuries sustained. Motor vehicle crashes and pedestrian knockdowns accounted for 83% of childhood injury deaths; this was followed by burns (8%) and then falls from various heights (4%). Less common causes of injury deaths included drowning, poisoning and accidental gunshot. Over 63% of the injured children were either brought in dead or died soon after arrival in hospital. Most of the injury deaths, especially those brought in dead or dying soon after arrival, did not figure in the hospital statistics. The data obtained from the mortuary records showed that most deaths are transport-related. The use of a simple questionnaire improved the reporting of deaths resulting from injuries during the study period. We believe that incorporating the present method of injury surveillance into our hospitals will go a long way to improve the reporting of deaths due to injuries and will form a basis for putting in place a national prevention strategy.

Keywords: Paediatric deaths, mortuary, statistics, injury, transport-related.

INTRODUCTION

In the developing countries of the world, injury contributes significantly to morbidity and mortality among children and adolescents. As we control infectious diseases and are exposed to technology, injury becomes a major source of childhood morbidity and mortality^{1,2}. Injury is known to be the major cause of death in the age group 1-15 years in both developed and developing countries^{2,3}. Exposure to technology without putting in place adequate safety measures in some developing countries has led to a dramatic increase in injury mortality especially in children⁴.

Epidemiological data from developing countries on injury are scanty and true occurrence and severity rates are largely unknown⁵. Data on deaths in general after injury are very difficult to come by in a developing country like Ghana, more so paediatric deaths. The usual sources of such data include police accident reports, health services records and death certificates. The accuracy of the data recorded in these sources leaves much to be desired. It is estimated that only 45% of births and 20% of deaths are officially reported in Ghana⁶. Many deaths from injuries are often unreported in developing countries because recording of deaths is not a systematic process⁷. There is also gross under-reporting as a significant proportion of the population does not use formal medical services⁸. This report attempts at determining some of the mechanisms of injury causing deaths among children brought to Komfo Anokye Teaching Hospital (KATH). It is hoped that the use of a simple questionnaire, which consistently and accurately evaluate each death, would help with the development

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of injury prevention strategies and the formulation of an injury surveillance system.

METHODS

Corpses of children, aged 14 years and below, delivered to the KATH mortuary either directly from the scene of accident/injury or from the wards between 1996 and 2000 were included in the study. During the study, two research workers were hired to visit the mortuary every day and obtain supplementary information besides the age and sex hitherto entered into the mortuary summary logbook. The supplementary information included mechanism of injury, place of injury, day of injury, type of injury and region of the body involved in the injury. This information was obtained from the mortuary attendants, relatives who were usually around, and people bringing corpses to the mortuary from the scene of accident. Data on patients who were admitted to hospital as a result of injury before dying were extracted from the necessary files. In the case of the last group of patients the attending doctor or relatives supplied additional information if the notes were incomplete. Data was collected using a questionnaire and input into a computer. Epi Info version 6 was used for analysis. The data was analysed for age, sex, mechanism of injury and possible cause of death.

RESULTS

There were 233 children in the study. Their ages ranged from 2 months to 14 years. The ages of three of the dead children were not stated (Table 1).

Table 1 Age and sex distribution of children who died after trauma.

Age group	Sex			Total
	Boy	Girl	Not Stated	
0-4	48	22	0	70
5-9	46	34	0	80
10-14	43	37	0	80
Unknown	1	0	2	3
Total	138	93	2	233

The boy: girl ratio was 1.5:1. The sexes of two of the children were also not stated. Motor vehicle/cycle crashes and pedestrian injuries accounted for over 83% of injury deaths (Table 2). These were followed by burns (8.2%) and falls (3.9%). The motor vehicle related deaths involved taxis

(34%), passenger lorries (11%) and motorcycles (9%). In 33% of the transport-related injury deaths, the type of vehicle involved was not specified but we think a vast majority of such cases involved pedestrians who were knocked down and then rushed to hospital without much attention being paid to the vehicle type or that the driver had absconded with the vehicle after committing the offence.

Table 2 Mechanism of injury

Mechanism*	No of Deaths	Percent (%)
Motor vehicle crashes	31	13.3
Motorcycle	13	5.6
Pedestrian knockdowns	148	63.5
Bicycle	1	0.4
Transport-related (not specified)	1	0.4
Burns from fire	10	4.3
Burns from scalds	7	3.0
Burns (not specified)	2	0.9
Gunshot wound-accidental	1	0.4
Falls	9	3.9
Others	8	3.4
Not stated	2	0.9
Total	233	100.0

Most injuries (141, 60.5%) leading to deaths occurred during the weekdays (Monday to Friday), when children were on their way to or from school. In 7 cases it was not stated the day in which the injury happened. The primary anatomical region injured, for those in whom it could be determined, was the head.

For those that the place of death was stated, more than 63% of the children were either brought in dead (BID) or died soon after arrival to the hospital (Table 3). It was not possible to determine the region of principal injury in most of such cases since autopsies were rarely performed on them. It is interesting to note that as many as 29.6% of the deaths occurred after admission. Of these, over 92% died in the intensive care unit (ICU). The deaths occurring in the ICU did not figure in the hospital statistics either, because the ICU is in the polyclinic, which is a separate building altogether. Thirty-nine percent of the children who survived long enough to be treated in hospital died within

the first 24 hours, usually from the complications of severe head injury.

Table 3 Place of death

Site of death	No. of Children	Percent (%)
At site of accident	115	49.4
ICU	64	27.5
Casualty	5	2.1
Ward	5	2.1
Not stated	44	18.9

DISCUSSION

Studies from developing countries indicated a steady increase in the number of injuries, especially road traffic injuries, over the last few decades as a result of rapid urbanization and motorization. Road traffic injuries caused more than a million deaths in 1998 and 80% of these deaths occurred in low and middle-income countries⁹. Africa is said to have the highest road traffic death rate of 28.2 per 100,000 population⁹.

Most of the deaths after injury in this study occurred in males (59.7%), a finding consistent with other studies^{10,11,12}. The most common cause of injury resulting in death was road traffic accidents^{12,13}. Motor vehicle crashes and pedestrian injuries account for the vast majority of deaths as reported in a previous study in Ghana^{14,15} and from other countries^{16,17} and are also a major cause of injury deaths in this study. Pedestrian injuries alone accounted for over 63% of all deaths in this series. In most of such cases head injury was usually the cause of death, a fact emphasized by other authors¹⁸. In this study up to 63% of the deaths occurred en route to hospital; in contrast about 80% of children perished without reaching hospital after injury in the study by Vane DW et al.¹⁹ In our series again, burns and falls were the second and third most common causes of injury deaths respectively, just as in other publications²⁰. In other studies concerning children, drowning was second to road traffic accidents and burns came third as the major cause of death after injury^{10,12,13}. There was only one death as a result of drowning in a one-and-half-year old child in this study.

The majority of deaths from burns in our series involved a total body surface area of 30% or more, which is similar to other studies²¹. Frequently, the

burns occur in the home, around the kitchen and fireplaces and are responsible for considerable morbidity and mortality^{22,23}.

Falls, especially from heights, were the cause of death of about 4% of the children in this series and is third after transport related injuries and burns. All the falls resulting in deaths were considered accidental or unintentional and, just as in other studies severe head injury accounted for a vast majority of deaths from falls²⁴.

From the data presented here, it is obvious that road traffic accidents, burns and falls are the leading mechanisms responsible for most deaths from injury in the paediatric age group in Kumasi and its environs. Therefore, all prevention strategies should focus on these mechanisms.

From this study, over 90% of the deaths occurring in inpatients after injury took place in the ICU. This suggests another way to prevent deaths after injury by improving the services in the ICU by way of equipping it with the necessary tools to work with, including ventilators (which were non-existent in the ICU at the time of the study) and training the personnel to man the ICU effectively. We also believe improving upon pre-hospital management of injured patients by the introduction of an ambulance system with well-trained personnel to man the ambulances will aid in minimizing disability and deaths. We need to aim at training people nationwide who will react to emergency situations quickly, can initiate resuscitation and stabilise patients as much as possible at the site of injury before transporting the injured person to hospital. Such measures will go a long way in reducing the number of people who die from injuries (or secondary injuries caused by mishandling of the injured person by untrained rescuers).

As a step towards addressing the injury problem as a whole, and especially road traffic injury in developing countries in particular, there is an urgent need for prevention strategies that are appropriate, cost-efficient and effective. To develop such strategies better and reliable information is required²⁵. Information about the numbers and types of injuries, circumstances in which injuries occur, morbidity and mortality rates is needed. These data will indicate just how serious the injury problem is and where prevention measures are most urgently needed²⁶. Injuries are preventable, including road traffic accidents. In the case of the latter, the design of safer vehicles fitted with safety mechanisms like seat belts, and airbags and the preven-

tion of the importation of old and dilapidated vehicles into the country, the building of appropriate roads with clearly marked lanes, the effective management of traffic, stricter application of legislation governing alcohol and driving²⁷ and the introduction of injury prevention programmes in the public health sector should help reduce deaths through trauma on the road. In the case of falls and burns, the major emphasis should be on identifying risk factors and then preventing falls and burns from happening in the first place. Children should be educated about the dangers of climbing trees (a major cause of falls from heights) and playing with fire or hot fluids. This education should be extended to adults as well. Fireplaces should also be made safer for cooking by adults. For example, instead of using open fires and open places for cooking, the fires and the cooking areas should be enclosed in such a way as to prevent children from getting access to such areas.

With reference to deaths involving children during the weekdays, which are mostly transport-related, it is suggested that children are trained in street-crossing skills in the early formative years²⁸. Children should also be appropriately supervised on their way to and from school. More importantly, drivers should be well trained and should have a minimum of basic education so as to be able to read and understand road signs and markings. We agree with Bergman AB *et al*²⁹ that childhood injuries can be reduced if the population is health conscious, law-abiding and values children. In their opinion support of trauma surveillance systems, injury prevention research and a broad-based safety education campaign using various groups will reduce injury in children drastically.

Up until now, the hospital's statistics on deaths from injuries included only those who were admitted to the wards and died on the wards. Before this study, corpses of children brought into the hospital from the site of injury, children who died soon after arrival to the casualty department and those who died in the ICU were not captured in the hospital's statistics.

In conclusion, existing sources of vital information about deaths due to injury are inadequate and there is also gross under-reporting of such events. Hospital and mortuary statistics can be effective means of improving data collection, especially deaths. Developing and implementing prevention strategies depend upon accurate estimates of the causes and number of disabilities and deaths from injury per year. Injuries in developing countries, includ-

ing Ghana, impact tremendously on the populations in terms of morbidity and mortality. To address the injury problem in any developing country, reliable data are needed at the national level for deciding national health priorities, planning prevention strategies to decrease the incidence of injuries and deaths, and for evaluating the impact of interventions. This study demonstrates the current inadequacy of data on deaths due to injury in Ghana and we think that the questionnaire (see appendix) should be applied elsewhere, after modification of course, to validate it. After this, we suggest that the questionnaire be implemented in hospitals across the country to help improve data collection on disabilities and deaths from injury and also aid planners develop prevention strategies.

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Appendix

KATH TRAUMA PATIENT DATA SUMMARY SHEET.

Section I.

1. Name _____ 2. Identification number _____
 2. Ward _____ 4. Age _____ 5. Sex _____

1. Date of admission _____ 7. Place of residence _____
 8. Place where injury occurred as accurately as possible (e.g. exact street location if outside): _____

Also, circle one of the following:

- A. Home – a. inside. b. Outside. E. Other building (specify) _____
 B. Road – a. paved. b. unpaved. D. Intersection – a. paved. b. unpaved.
 E. Farm. F. Other (specify) _____

9. Mechanism of injury. Circle one:

- Transport related: A. Motor vehicle crash. B. Motorcycle. C. Bicycle
 D. Pedestrian knockdown. E. Other (specify) _____
 Burn: A. Fire. B. Scald. C. Other (specify) _____
 Penetrating: A. Stab/Slash – accidental. B. Stab/Slash – intentional
 C. Gunshot wound – accidental. D. Gunshot wound – intentional.
 Assault Blunt.
 Fall From what _____
 Snake bite Other: describe _____

Questions 10 – 14 apply to transportation related injuries.

10. If the victim was injured in or by a motor vehicle. What type of vehicle was involved? (This should include type of vehicle involved in knockdowns/pedestrian injuries). Circle all that apply:
 A. Taxi. B. Private auto. C. Car – not otherwise specified. D. Commercial cargo “lorry”: what cargo _____ E. Public passenger “lorry”, if so, what was the capacity _____ and how many occupants were present _____. F. Motorcycle.
 G. Motorized vehicle, not otherwise specified. H. Other (specify) _____
 11. If road traffic accident, was the victim the driver? Y N Don't know.
 12. Was the injured person wearing a seatbelt? Y N Don't know.
 13. If the injured person was riding a motorcycle, was he wearing a helmet? Y N Don't know.
 14. If the person was injured while in motion in a motor vehicle, motorcycle, or bicycle, what did their vehicle strike:
 A. Another moving vehicle, what type: _____ B. Stationary object, what type: _____
 C. Other (specify) _____ D. Did not strike anything.
 E. Don't know.
 15. Occupational related? Y N If Y, what occupation? _____
 16. Date of injury _____ : day of week: _____
 17. Time of injury (accurately if known, otherwise time of day) _____
 18. Was the person cared for at any other health care facility before coming to KATH: (whether traditional, primary health care site, or hospital). Y N. If Y, what place(s) _____
 19. How did the injured person reach KATH?
 A. Taxi – paid for. B. Private car of individual or their friends/relatives. C. Good Samaritan. D. Knockdown vehicle – person who hit them brought them in.
 E. Ambulance. G. Police. F. Other (specify) _____

Section II.

20. How long between injury and arrival to KATH _____
 21. First recorded vital signs at KATH: BP. _____ P. _____ RR. _____
 22. I. V. fluids in casualty ward. Y N. Volume of IV fluids if known _____
 23. Description of injury. Include initial Glasgow Coma Score and how long unconscious for head injuries.
 24. AIS scoring: Head _____, Neck _____, Face _____, Spine _____, Chest _____, Abdomen _____, Upper Extremity _____, Lower Extremity _____, Skin _____.

Section III.

25. Operative procedures – by type with dates:

If first operative procedure was an emergency, state time between arrival to casualty ward and operation (in hours) _____

Section IV.

26. Outcome – L vs. D. If died, where was site of death _____
 27. Length of hospital stay _____
 28. Blood transfusion – number of pints _____
 29. Functional status – graded by limitation of (i) self care; (ii) mobility; (iii) major – e.g. unable to walk than ¼ of a mile or to grasp with one of hands; (iv) minor; (v) none; (vi) not able to determine yet.
 30. Charge for hospitalization _____

Abbreviations:

- Y – yes
 N – no
 BP – Blood pressure
 P – Pulse
 RR – Respiratory rate
 AIS – Abbreviated injury severity