Epidemiology of paediatric injuries in Nepal: evidence from emergency department injury surveillance

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ABSTRACT

Background Globally, injuries cause >5 million deaths annually and children and young people are particularly vulnerable. Injuries are the leading cause of death in people aged 5–24 years and a leading cause of disability. In most low-income and middle-income countries where the majority of global child injury burden occurs, systems for routinely collecting injury data are limited.

Methods A new model of injury surveillance for use in emergency departments in Nepal was designed and piloted. Data from patients presenting with injuries were collected prospectively over 12 months and used to describe the epidemiology of paediatric injury presentations.

Results The total number of children <18 years of age presenting with injury was 2696, representing 27% of all patients presenting with injuries enrolled. Most injuries in children presenting to the emergency departments in this study were unintentional and over half of children were <10 years of age. Falls, animal bites/stings and road traffic injuries accounted for nearly 75% of all injuries with poisonings, burns and drownings presenting proportionately less often. Over half of injuries were cuts, bites and open wounds. In-hospital child mortality from injury was 1%.

Conclusion Injuries affecting children in Nepal represent a significant burden. The data on injuries observed from falls, road traffic injuries and injuries related to animals suggest potential areas for injury prevention. This is the biggest prospective injury surveillance study in Nepal in recent years and supports the case for using injury surveillance to monitor child morbidity and mortality through improved data.

BACKGROUND

Globally, injuries cause >5 million deaths annually—a similar number to those from HIV/AIDS, tuberculosis and malaria combined.1 Children and young people are a particularly vulnerable group and injuries are the leading cause of death in people aged 5–24 years globally,2 3 and of disability for people aged 5–44 years.4

The majority of global child mortality and morbidity from injuries occurs in low-income and middle-income countries (LMICs).5 6 Paediatric trauma has been highlighted as a global health priority,7 yet challenges exist to identify injured children in LMICs and conflict settings, resulting in calls for better data and for injury surveillance.8

Reliable estimates of injury burden in Nepal are limited.9 In 2017, injuries were estimated to account for nearly 10% of all deaths in Nepal, with transport injuries, falls, drowning, animal related, burn, self-harm and interpersonal violence as the leading causes.10 Children living in Nepal face significant health challenges, with an under-5 mortality of 39 per 1000 live births.11

The quality of data relating to childhood and adult injury is inversely correlated to where the greatest problems exist. Existing data on trauma in most LMICs remain poor, with LIC/IC injury data constituting around 1% of all data. The use of injury surveillance systems has been proposed as a way to improve this.12 The collection and use of data on risk factors, incidence, severity, outcomes and costs can assist in identifying populations at risk, implementing and evaluating prevention programmes and formulating and evaluating policy.13 This study was designed to inform injury prevention activities and policy development and is focused on surveillance and data collection tools to describe the epidemiology of childhood injury.

METHODS

Objectives of this mixed methods study were (i) to design an injury surveillance tool and data
collection of data on injuries presenting to two hospital emergency departments over 12 months; (iii) process evaluation to explore the barriers and facilitators to sustainability (reported separately). The published study protocol describes data collector recruitment and training, data tool testing and quality assurance. This paper reports injury cases presenting in children under the age of 18 years. The data on adult patients are reported separately.

The Makwanpur district of Nepal has an estimated population of 420,477, including 174,417 children aged 0–17 years inclusive (50.2% male). Most of the population live in rural areas (83%). Both study hospitals are in Hetauda, a submetropolitan city approximately 120 km southeast of Kathmandu. Both are tertiary care hospitals and have the facilities to provide treatment for major and minor trauma. Most local injury cases attend these hospitals because of the long distances to other tertiary care hospitals and poor transportation systems. Hetauda hospital is a government-funded district hospital with 110 beds serving about 300 emergency and outpatient attendances per day. There are 19 doctors and 47 nursing and paramedic staff. Chure Hill Hospital is a private hospital with 25 beds serving about 60 emergency and outpatient attendances per day. There are 12 doctors and 65 nursing and paramedic staff (source: verbal inquiry with the hospital management authority).

For inclusion in the surveillance study, patients met the following criteria: presenting to either of the two study hospitals, with a new injury, of any cause, within 7 days of the injury event. Exclusion criteria were: repeated attendance in the same department for the same injury; previous attendance in other study site for the same injury; or injury sustained >7 days prior to presentation. Data were collected from patients presenting with injuries between 1 April 2019 and 24 March 2020 inclusive (data collection ended 1 week earlier than scheduled because of the COVID-19 pandemic). A standardised data collection form was developed from existing tools and adapted for the Nepal context. Once urgent clinical care had been given, data collectors approached the patient (or carer, where necessary and appropriate) for consent to participate. Verbal consent was recorded on tablet computers together with anonymised patient data on sociodemographics, date of injury, mechanism of injury, clinical presentation, diagnosis, severity of injury and disposition. Data collectors were trained how to categorise the diagnosis based on information collected from patients/carers, thereby reducing the risk of misclassification. The level of injury severity was agreed by the data collector in conjunction with the clinical staff and was classified depending on the level of skilled emergency care required. Data were entered electronically using Research Electronic Data Capture software, where they were encrypted and uploaded to a secure online database. The final non-identifiable dataset was exported for analysis using SPSS.

For data analysis, frequency data were explored by age, sex, ethnic group, setting of injury event, type and mechanism of injury and disposition. Rates of injuries by age and sex were calculated using Makwanpur population estimates from the 2011 census. Associations between injury severity, sex and age group were explored using χ² analysis, and two age groups (<15 years and 15–17 years) to compare injury severity in younger children with young adults.

RESULTS

The total number of patients that presented to the emergency departments during the study period was 33,046, of which 10,154 (30.7%) were patients of any age with injuries who were eligible for inclusion and consented. For the nested study reported here relating to children with injuries, 2696 (26.6%) were patients under the age of 18 years, with 2274 (84.3%) presenting to Hetauda hospital and 422 (15.7%) to Chure Hill hospital (figure 1).

Most children presenting with injuries to the emergency departments were male (66%) and <10 years of age (56.3%). Sociodemographic and injury characteristics are shown in table 1. The majority (95%) of injuries presenting to the emergency department were reported by parents to have occurred unintentionally. Injury data by unintentional and intentional mechanisms are shown in table 2.

Where did childhood injuries occur?

The most common location for childhood injury in this study was at home (n=15,766, 58%) followed by the highway/road (n=6,363, 24%), together accounting for 82% of all injuries. While the majority of injuries sustained on the road/highway were due to road traffic (368/6,363, 61%), 160/6,363 children (25%) were injured by animal bites/stings and 90/6,363 (14%) by falls.

What were children doing when they were injured?

The most common activity at the time of the injury occurrence was ‘leisure/play’ (70.1%), followed by ‘travelling’ (11%) and ‘work’ (7.5%). Most children injured during ‘work’ were aged 15–17 years, but it is noteworthy that 45% of children injured while working were aged 5–14 years.

What do the data tell us about injury mechanisms in children?

Falls (35.6%), animal bites and stings (28.4%) and road traffic injuries (13.9%) accounted for nearly 75% of all child injuries presenting to emergency departments in this study. A large majority of animal-related injuries were from dog bites accounting for 555/728 (76%) of these injuries, followed by injuries from cats (5%), scorpions (5%) and snakes (4%). Animal bites mostly affected children aged 5–9 years (36% of all bite injuries). Some injury mechanisms were notably infrequent—drowning (0.3%); unintentional poisonings (2.0%); burns and scalds (2.0%).

Figure 1 Patients with injuries attending emergency departments in Makwanpur district, Nepal, April 2019–March 2020.
**What types of injury did children sustain?**

The majority of injuries (51.1%) presenting to emergency departments were cuts, bites and open wounds, followed by bruises/superficial injuries (14.2%), fractures (11.1%), sprains/dislocations (9.0%), head injury/concussion (3.1%) and burns (2.5%).

**Was there much self-harm and what kind?**

Self-harm presentations accounted for 2.2% (n=61) of all child injury attendances in this study. Self-harm was the most common in females (72%) and mostly in children aged 15–17 years (75%). Over half (62.3%) of self-harm presentations were from poisonings/overdose followed by strangulation/hanging (20%). Intentional poisonings made up 43% of poisoning cases with pesticide and insecticide poisoning accounting for 38% of self-harm poisonings. There were no deaths from intentional poisonings.

**What about violence and assault?**

There were 75 assault-related injury presentations representing 2.8% of all child injury attendances.

Assault was the most common in males (79%) and in those aged 15–17 years (50.7%). The most common causes of assault injuries were ‘bodily force’ (57.3%); being injured by a blunt object (24%) or being stabbed/cut (10.7%). These three injury mechanisms together accounted for 92% of assault injuries. Alcohol was identified as a factor in 9% of injuries ensuing from violence and assault but other drugs were not implicated in cases.

**Injury severity and disposition**

In this study, 61% (n=1645) of injuries were recorded as ‘minor’ with ‘moderate’ severity injuries accounting for 30.2% (n=813) of injury presentations. Severe injuries accounted for 4.1% (n=111) of childhood injury presentations. Age and sex associations with injury severity are shown in table 3.

The in-hospital mortality for injured children in this study was around 1% (21 children). Ten of the 21 deaths (48%) were due to self-harm hanging/strangulation. Of the children that died, nine were 15–17 years of age (43%); six were aged 10–14 years (29%) and five were in the 0–4 age group (24%). The mechanisms of injury leading to death in children aged 0–4 years were road traffic injuries, choking/suffocation and drowning.

**DISCUSSION**

This study illustrated the feasibility of establishing injury surveillance in a government and private hospital in Nepal, and provides the largest prospective dataset published in recent years and the only one to yield so much data on the paediatric population.
Most childhood injuries in this study were falls, animal bites and stings, and road traffic injuries and disproportionately affected male children under the age of 10 years. This resembles systematic review findings relating to injury burden in Nepal which, though in all age groups, found that the leading types of injury were falls, road traffic injuries, and cuts. The Nepalese injury literature has previously shown that road traffic injuries are a leading cause of morbidity and mortality in Nepal.26,27 Implementation and evaluation of campaigns to improve first aid and appropriate attendance at hospitals appear warranted.

Table 2  Distribution of injuries by age group, sex and mechanism of injury among children attending emergency of hospitals in Makwanpur district, Nepal, April 2019–March 2020

| Age groups and sex | 0–4 years | 5–9 years | 10–14 years | 15–17 years |
|--------------------|-----------|-----------|-------------|------------|
| 0–4 years          | 239 (36.9)| 328 (38.5)| 249 (38.4) | 96 (23.2)  |
| 5–9 years          | 260 (30.5)| 190 (29.3)| 103 (24.9) | 470 (27.6) |
| 10–14 years        | 108 (12.7)| 86 (13.3) | 113 (27.4) | 223 (13.1) |
| 15–17 years        | 54 (8.3)  | 74 (8.7)  | 49 (7.6)   | 24 (5.8)   |
| Fall               | 20 (3.1)  | 56 (6.6)  | 49 (7.6)   | 51 (12.3)  |
| Animal or insect related | 42 (6.5) | 10 (1.2)  | 9 (1.4)    | 4 (1.0)    |
| Road traffic injury | 33 (5.1)  | 6 (0.7)   | 5 (0.8)    | 8 (1.9)    |
| Injured by a blunt object | 2 (0.3) | 0 (0.0)   | 3 (0.5)    | 7 (1.7)    |
| Poisoning          | 9 (9.5)   | 5 (0.6)   | 6 (1.0)    | 2 (0.5)    |
| Suffocation/Choking | 3 (5.0)   | 1 (8.3)   | 11 (57.9)  | 28 (73.7)  |
| Electrocutation     | 2 (0.3)   | 0 (0.0)   | 3 (0.5)    | 7 (1.7)    |
| Total              | 3 (5.0)   | 1 (8.3)   | 11 (57.9)  | 28 (73.7)  |
| Unintentional      | 239 (36.9)| 328 (38.5)| 249 (38.4) | 96 (23.2)  |
| Animal or insect related | 260 (30.5)| 190 (29.3)| 103 (24.9) | 470 (27.6) |
| Road traffic injury | 108 (12.7)| 86 (13.3) | 113 (27.4) | 223 (13.1) |
| Injured by a blunt object | 54 (8.3)| 74 (8.7)  | 49 (7.6)   | 24 (5.8)   |
| Poisoning          | 20 (3.1)  | 56 (6.6)  | 49 (7.6)   | 51 (12.3)  |
| Suffocation/Choking | 42 (6.5) | 10 (1.2)  | 9 (1.4)    | 4 (1.0)    |
| Electrocutation     | 33 (5.1)  | 6 (0.7)   | 5 (0.8)    | 8 (1.9)    |
| Total              | 647 (100) | 852 (100) | 648 (100)  | 413 (100)  |
| Self-harm           | 0 (0.0)   | 0 (0.0)   | 6 (46.2)   | 32 (69.6)  |
| Hanging             | 0 (0.0)   | 0 (0.0)   | 3 (23.1)   | 9 (19.6)   |
| Other               | 0 (0.0)   | 2 (100)   | 4 (30.8)   | 5 (10.9)   |
| Total              | 0 (0.0)   | 2 (100)   | 13 (100)   | 46 (100)   |
| Assault             | 3 (50.0)  | 1 (8.3)   | 11 (57.9)  | 28 (73.7)  |
| Injured by a blunt object | 2 (33.3) | 8 (66.7)  | 4 (21.1)   | 4 (10.5)   |
| Other               | 1 (16.7)  | 3 (24.9)  | 4 (21.1)   | 6 (15.7)   |
| Total              | 6 (100)   | 12 (100)  | 19 (100)   | 38 (100)   |

* Rates calculated using population estimates for Makwanpur from the 2011 census.

and transport, as much of Makwanpur district is rural and travel times are long. Previous community surveys of burn care suggest low knowledge of burn first aid (including appropriate cooling) and common use of lotions and pastes (e.g., tomato, herbs and cow dung). Implementation and evaluation of campaigns to improve first aid and appropriate attendance at hospitals appear warranted.

Studies reporting self-poisoning indicate this is a relatively common presentation, predominantly in young adults.10 Our study indicates the issue occurs in young people too. The data confirm previous findings of organophosphate pesticides as the predominant agent used in self-harm poisonings, while in unintentional poisonings the agents were often kerosene or medications. In this study, 40% of all poisonings were reported to be intentional, however, establishing intentionality is challenging, and this finding is likely to be affected by social desirability bias.

Previous studies reporting drownings in Nepal have shown children to be highly vulnerable28 and while the number of cases were relatively low, the data are in keeping with previous results. In neighbouring countries like Bangladesh and India, drowning is a leading cause of death, especially in children aged 1–4 years.29,30 Relatively low numbers of child drowning presentations to emergency departments in Nepal may reflect the fact that children may die at the scene of the event and not present to the emergency department. We did not observe any seasonal increase in drownings (or any other injury type) coinciding with the monsoon season between June and September (figure 2).

The study indicates groups of children vulnerable to specific injury types or to injuries occurring in specific locations; for example, dog bites in primary school aged children or road traffic injuries and self-poisoning in children aged 15–17 years. These

Table 3  Association between injury severity and (i) sex; (ii) age group among children attending emergency of hospitals in Makwanpur district, Nepal, April 2019–March 2020

| Minor/Moderate n (%) | Severe n (%) | Total n (%) | χ² (p value) |
|----------------------|--------------|-------------|--------------|
| Male                 | 1716 (66%)   | 54 (54%)    | 1776 (100)   | 7.261 (0.007) |
| Female               | 867 (34%)    | 51 (46%)    | 918 (100)    | 4.033 (0.044) |
| Total                | 2583 (100)   | 105 (100)   | 2688 (100)   | 11.303 (0.003) |
| <15 years            | 2128 (82%)   | 69 (62%)    | 2197 (100)   | 28.93 (<0.001) |
| 15–17 years          | 455 (18%)    | 42 (38%)    | 497 (100)    | 1.033 (0.310)  |
| Total                | 2583 (100)   | 111 (100)   | 2694 (100)   | 11.303 (0.003) |
injury surveillance. We would recommend prioritising engagement with both hospital management boards have indicated interest in a surveillance system that was based on externalisation. We plan to collect all injury cases in the emergency departments for facilitating data collection in their settings. We are grateful for the support of the Makwanpur Municipality for approving this project. We would like to acknowledge the support of the wider research team at the NIHR Global Health Research Group on Nepal Injury Research at Kathmandu Medical College who have assisted in establishing the data collection system in these settings.


data thereby present an opportunity for targeted prevention and policy interventions. Such targeted approaches have the potential to reduce injuries in children in this part of Nepal and more widely across the country. There are over 100 different ethnic groups in Nepal, and a number of different classification systems for different castes which often determine parental occupation and family income. As injury occurrence is known to be associated with deprivation, further research on ethnic group distribution of injuries appears warranted, and our study has shown that it is feasible to collect complete ethnic group data. There is currently no national injury prevention strategy in Nepal, and although road traffic injuries are gaining attention, coordinated efforts are needed to reduce injuries in children in this part of Nepal and more broadly.

The main limitation of this study is that of selection bias because it will only have identified children with injuries presenting to the emergency departments. Data on children with injuries seeking care from hospitals outside the district, from community-based health services, local healers or receiving self-care will not have been captured. Our study will therefore have underestimated the true burden of injuries in the communities being studied, but is likely to have captured the majority of moderate and severe injuries. Regarding child injury deaths specifically, our anecdotal experience is that most patients who have died from trauma in this region are brought to the hospital as part of police investigations and for postmortem examination. These elements should be considered when interpreting the data and generalising the findings beyond the study setting. Strengths of the study are in its use of a structured programme of surveillance to collect all injury cases in the emergency departments reported over a period of 12 months. Comprehensive training and support for data collectors and regular feedback of collected data to clinical teams resulted in high levels of completeness and data quality.

While this study delivered a hospital-based injury surveillance system that was time limited, poststudy dissemination activities with both hospital management boards have indicated interest to establish sustainable in-house systems in the future. There are important lessons to be learnt from this study about undertaking injury surveillance. We would recommend prioritising engagement of local health partners, staff training on data collection, use of digital data tools and continuing support and feedback on the surveillance process. Data from injury surveillance can highlight opportunities for prevention and policy change. To support the development of evidence-based injury prevention and prehospital care in Nepal, the establishment of functioning hospital-based injury surveillance systems are an important approach.

CONCLUSION

This study confirms that injuries affecting children in Nepal represent a significant issue. The data observed on injuries from falls, road traffic injuries and injuries related to animals suggest potential areas for injury prevention. This is the biggest prospective injury surveillance study in Nepal in recent years and supports the case for using injury surveillance to monitor child morbidity and mortality through improved data.

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Contributors The study was conceived by JM, SaB, SKJ and DM. The study design, methods and data analysis plan were drafted by DM, SaB and JM and refined and implemented with SKJ, SM, EI and SuB. SuB and SaB provided technical input for data collection and quality assurance, with data collection supported by SM. DM drafted and finalised the manuscript. All authors contributed to drafts and approved the final manuscript.

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REFERENCES

1 World Health Organization. Injuries and violence: the facts. World Health Organization, 2014.

2 GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the global burden of disease study 2015. Lancet 2016;388:1459–544.

3 Chandran A, Hyder AA, Peek-Asa C. The global burden of unintentional injuries and an agenda for progress. Epidemiol Rev 2010;32:110–20.
4 He S, Lunnen JC, Puxanachandra P, et al. Global childhood unintentional injury study: multisite surveillance data. Am J Public Health 2014;104:e79–84.
5 Debas HT, Donkor P, Gawande A. Disease control priorities, (volume 1): essential surgery; the world bank, 2015.
6 Peden M, Kayode O, Ozanne-Smith J. World report on child injury prevention. Geneva, Switzerland:World Health Organization, 2018.
7 Mock C, Abantanga F, Goosen J, et al. Strengthening care of injured children globally. Bull World Health Organ 2009;87:382–9.
8 Kiragu AW, Dunlop SJ, Mwuramba N, et al. Pediatric trauma care in low resource settings: challenges, opportunities, and solutions. Front Pediatr 2018;6:155.
9 Bradshaw CJ, Bandi AS, Muktar Z, et al. International study of the epidemiology of paediatric trauma: PAPSA research study. World J Surg 2018;42:1885–94.
10 Mytton JA, Bhatta S, Thome M, et al. Understanding the burden of injuries in Nepal: a systematic review of published studies. Cogent Med 2019;6:1673654.
11 Pant PR, Banstola A, Bhatta S, et al. Burden of injuries in Nepal, 1990-2017: findings from the global burden of disease study 2017. Inj Prev 2020;26:657–66.
12 Ministry of Health and Population. Nepal demographic and health survey 2016. Kathmandu, Nepal: Ministry of Health and Population, Nepal, 2017.
13 O’Reilly GM, Cameron PA, Joshipura M. Global trauma registry mapping: a scoping review. Injury 2012;43:1148–53.
14 World Health Organization. Injury surveillance guidelines: World Health organization, 2001.
15 Magnus D, Bhatta S, Mytton J, et al. Establishing injury surveillance in emergency departments in Nepal: protocol for mixed methods prospective study. BMC Health Serv Res 2020;20:1–9.
16 Central Bureau of Statistics. National population and housing census 2011 (national report. Kathmandu, Nepal: National Planning Commission, Central Bureau of Statistics, 2012.
17 Bhatta S, Pant PR, Mytton J. Usefulness of hospital emergency department records to explore access to injury care in Nepal. Int J Emerg Med 2016;9:21.
18 Laytin AD, Azach A, Girma B, et al. Mixed methods process evaluation of pilot implementation of the African Federation for emergency medicine trauma data project protocol in Ethiopia. Afr J Emerg Med 2019;9:528–31.
19 Royal Society for the Prevention of Accidents. 24Th (final) report of the home and leisure accident surveillance system 2000, 2001 and 2002 data: RoSPA Birmingham, 2002.
20 Harris PA, Taylor R, Thieleke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42:377–81.
21 Harris PA, Taylor R, Minor BL, et al. The REDCap Consortium: building an international community of software platform partners. J Biomed Inform 2019;95:103208.
22 IBM Corp. IBM SPSS Statistics for Windows, Version 24.0 [program], Armonk, NY: IBM Corp, 2019.
23 Poudel-Tandukar K, Nakahara S, Ichikawa M, et al. Risk perception, road behavior, and pedestrian injury among adolescent students in Kathmandu, Nepal. Inj Prev 2007;13:258–63.
24 Poudel-Tandukar K, Nakahara S, Ichikawa M, et al. Unintentional injuries among school adolescents in Kathmandu, Nepal: a descriptive study. Public Health 2006;120:641–9.
25 Magar CT, Devkota K, Gupta R, et al. A hospital based epidemiological study of snakebite in Western development region, Nepal. Toxicon 2013;69:98–102.
26 Tripathee S, Basnet SJ. Epidemiology of burn injuries in Nepal: a systemic review. Burns Trauma 2017:5.
27 Phuwal K, Ogada EA, Bendell R, et al. Burns in Nepal: a participatory, community survey of burn cases and knowledge, attitudes and practices to burn care and prevention in three rural municipalities. BMJ Open 2020;10:e033071.
28 Sedain B, Pant PR. Status of drowning in Nepal: a study of central police data. F1000Res 2018;7:576.
29 Rahman A, Jagnoor J, Baset KU, et al. Vulnerability to fatal drowning among the population in southern Bangladesh: findings from a cross-sectional household survey. BMJ Open 2019;9:e027896.
30 Gupta M, Bhaumik S, Roy S, et al. Determining child drowning mortality in the Sundarbans, India: applying the community knowledge approach. Inj Prev 2020. doi:10.1136/injuryprev-2020-043911. [Epub ahead of print: 17 Sep 2020].
31 He S, Lunnen JC, Puxanachandra P, et al. Global childhood unintentional injury study: multisite surveillance data. Am J Public Health 2014;104:e79–84.
32 Lakshmi PV, Tripathy JP, Tripathy N, et al. A pilot study of a hospital-based injury surveillance system in a secondary level district hospital in India: lessons learnt and way ahead. Inj Epidemiol 2016;3:24.