

Injury Surveillance System in Bangladesh: a new approach

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Background & Rationale

It is now well established that injury is a leading cause of death and disability among 1-17 year old children in Bangladesh. The government of Bangladesh and development agencies realize that injury is one of the obstacles to economic development and now is the right time for action. To address the magnitude and determinants of injury, the Centre for Injury Prevention and Research Bangladesh, (CIPRB), collaborating with UNICEF Bangladesh, Director General of Health Services (DGHS), The Alliance for Safe Children, (TASC), and others is conducting a community based intervention programme known as **PRECISE**, the “*Prevention of Child Injuries through Social Intervention and Education*”.

Many different information systems are now used to monitor fatal and non-fatal injuries in developed countries, but much less is known about the extent of these injuries in developing countries. Historically, the majority of information regarding injury is derived from mortality and hospitalisation data. This information does not reflect the full extent of the injury problem because most people who are injured do not die from their injuries or receive treatment in hospitals. Adequate data about types of injuries and their causes is vital to understand injury problems. Community based injury surveillance, while normally difficult to sustain, is a way to more accurately characterise the magnitude of injury problems in middle and low-income countries.

The community based Injury Surveillance System in Bangladesh is currently developing a fatal and non -fatal injury surveillance system to provide estimates for the incidence and types of injury, risk factors and demographic profiles of injured in rural community. The project is informed by the public health approach to injury prevention, and consists of five components. First, mortality Surveillance System, which aims to monitor all fatal injuries occurring every month at the community. Second, an injury monitoring system, which track patterns of all injury among a small sample of newly injured victims at the community. Third, a non-fatal injury surveillance system that will monitor a sentinel sample of newly injured victims. Fourth, a surveillance system, that monitor the knowledge and practice of the community people. Finally, demographic surveillance system, which monitors the socio-economic and demographic profiles of households of the community.

Goal and Objectives

The goal of the surveillance system is to characterize the injury problem in Bangladesh and to prevent others from experiencing adverse health effects from injury exposure.

The surveillance data are used to:

- Identify groups at risk for injury-related deaths and illnesses;
- Detect trends if any;
- Identify hospitalization and cost due to injury;
- Identify knowledge and practices regarding injury prevention;
- Identify the demographic events (birth, death, marriage and migration);
- Provide information for planning and evaluating the intervention programs

Methods

Sites

Three upazilas (sub-district) from three different districts were chosen for the ISS. These upazilas are Raiganj from Sirajganj district, Sherpur sadar from Sherpur district, Monohardi from Narshindi district. The selection criteria of these three upazilas were firstly; geographically they are nationally represented except the hilly areas. Secondly, previous study found mortality due to injury were similar extent in these upazilas and consistent with the national. And lastly, the socio-economic and demographic characteristics of the population in these upazilas were similar and also consistent with the national.

Mapping and numbering

To fulfil the requirement of the needed 200,000 populations from Raiganj upazila, 5 unions are chosen for the surveillance system out of 9 unions. In the Sherpur and Manohordi upazila, 7 unions and 8 unions are chosen out of 14 unions and 11 unions respectively. Each upazila was divided into thirty blocks. Data collectors assigned a unique number for each of the households. The household numbering was provided on the basis of each block of the surveillance area.

Data collection and store

The baseline census of the population was conducted during October -December 2005. The data collector collects data every month from each household on a fixed schedule 60-70 households on their assigned block. The aim of this regular visit is 1) to identify all demographic (birth, death, marriage, migration), and health (illness and injuries) events occurring in the surveillance area; 2) to record all population movements to ensure accurate denominators for the surveillance data; and 3) to collect information on health status, health knowledge and behaviour and responses of the community people in the injury prevention programme. A verbal autopsy is done when an injury death occurs, and a detailed interview is done for any serious injury event. Two types of quality control bodies have been formed to maintain the quality of surveillance data. One is central, and the other is local. Data is entered into a custom SQL relational database using Visual Basic software.

Results

This result is based on the information available from January 2006 to December 2006 of the three areas. Information regarding injuries includes those of moderate severity (three days absence from usual work), higher severity (seeking treatment for injuries), or death from injury during this period. The report shows the occurrence of fatal and non-fatal injury by age in the three regions. Total households and population of the surveillance area are 132475 and 574474 respectively. The average household size is 4.3. Sex ratio is 104.

Birth rate and Death rate

Respondent of the area were asked whether there is an event (i.e. birth, death, illness or injury, marriage and migration) occurred last one month. Last one-year 3773 deaths and 11673 births and 162430 ill cases were recorded in these three area. The overall crude birth rate is about 20.3 /1000 population, which is similar to the national (20.9/1000) average found in sample vital registration system 2003 (SVRS). Crude birth rate is also similar in all

the three area (Table-1). The overall death rate was 6.6 per thousand populations, which is almost similar as compare to national (5.9). Infant mortality and child mortality rate are 68.5 and 12.8 per thousand live births. Infant mortality rate is slightly higher as compare to national (57).

Injury mortality

Injury accounted for 6.4 percent of all deaths. The proportion of injury related death was higher among the children. Except first year of life, it is observed that more than 20 percent of death was due to injury among 1-17 year's children. Among 1-4 years children, 23% death accounted for injury and the rate was 72.3 per 100000 children. Causes of injury deaths was drowning, road traffic accident, electrocution, violence, animal bite and suicide. Drowning is the main killer of under five children (58.2/100000) after infancy. The injury mortality rate in all children (0-17 years) was found 42.1 per 100,000 children per year. However, the rate was 42.0 per 100,000 per year children when infants were excluded.

Injury morbidity

In children age 1-17 years, 15 percent of total illness was due to injury. The morbidity rate due to injury including infants was 3961 per 100,000 populations. The highest morbidity rate due to injury was observed in children 1-4 years with a rate of 6027 per 100,000 children (Table-3). Fall related injury was found the leading cause of non-fatal injury cause of illness in all children including infants. The next leading cause was sharp weapon cut that was followed by burn. Besides, road traffic injury and animal bite was common in the surveillance area. Almost 4% of injured ill patient admitted to hospital whereas only 1.5% of non-injury patient admitted to hospital. The proportion of hospital admission was significantly ($p < 0.001$) higher due to injury after first year of life (Fig: 1). This proportion increased with the age of children. However, hospital admission due to illness was 511 per 100000 populations. Among the children the rate of hospital admission was highest (361/100000) among the 1-4 years children except infancy.

Conclusion

The ISS is the first large-scale, injury surveillance system being implemented in a developing country. In many ways, it is the equivalent of the Matlab DSS, but focusing primarily on injury. Findings of the study reveal that injury mortality rate is higher among the 1-10 years. The leading causes of injury mortality among children are drowning, road traffic injury and violence. There is a positive relation with the hospital admission due to injury and the age of children.

Table: 1 Demographic indicators of surveillance area

	Raiganj	Sherpur	Monohardi	Total
CBR (per 1000)	21.3	20.1	19.5	20.3
CDR (per 1000)	6.2	6.7	6.8	6.6
IMR (per 1000)	67.0	72.2	66.1	68.5
Child mortality (1-4)	12.8	12.2	12.3	12.4

Table: 2 Age specific death rate per 100000 population

	Injury	%	Rate	Non-injury	%	Rate	Total	Rate
<1	7	0.8	55.9	843	99.2	6732.7	850	6788.6
1-4	41	23.2	72.3	136	76.8	239.8	177	312.1
5-9	27	21.1	37.4	101	78.9	139.8	128	177.1
10-14	14	25.0	22.7	42	75.0	68.0	56	90.7
15-17	12	25.5	36.2	35	74.5	105.6	47	141.8
>=18	141	5.6	41.7	2374	94.4	702.2	2515	743.9
Total	242	6.4	42.1	3531	93.6	614.6	3773	656.8

Table: 3 Age specific morbidity rate per 100000 population

	Injury	%	Rate	Non-injury	%	Rate	Total	Rate
<1	388	4.3	3098.8	8581	95.7	68532.9	8969	71631.7
1-4	3418	11.7	6027.3	25776	88.3	45453.1	29194	51480.4
5-9	3559	16.6	4925.4	17898	83.4	24769.6	21457	29695.0
10-14	2173	17.9	3518.2	9953	82.1	16114.6	12126	19632.8
15-17	974	15.8	2938.5	5188	84.2	15652.0	6162	18590.5
>=18	12245	14.5	3622.0	72277	85.5	21378.9	84522	25000.9
Total	22757	14.0	3961.4	139673	86.0	24313.2	162430	28274.6

Figure: 1 Admission to hospital