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Original Article

Pattern of Injuries Among Children of Urban Slum Dwellers in Dhaka City

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Abstract:

This cross sectional study was conducted among the children aged 18 years and below at korail slum, near Gulshan Lake, Banani, Dhaka during March to June 2007 to ascertain the pattern of injuries and the risk factors associated with those injuries. Data were collected using cluster sampling technique. The total numbers of children under study in the surveyed house-holds were 486 and out of them 210 were injured. The prevalence of injury was, therefore, 43.2% or 432 per 1000 children. Nearly half (47%) of the participants were between 10-15 years of age and only about 2% were 15-18 years. The mean age was 8.8 ±3.4 years and the lowest and highest ages were 6 months and 17 years respectively. Male-female ratio was almost 1:1 and injury rate did not vary at all with respect to sex. The highest injury rate was observed among <5 yrs children (49%) and the lowest among those aged 15-18 yrs (39%). However, variation in age specific injury rates was not remarkable. The highest number of child injury was due to burn (33%), followed by road accident (29%) and occupational injury (14%). Other causes of child injuries were fall on the street (8%), animal bite (4%), fall from tree (1.5%), drowning (2%), fall from roof (3%), electric burn (1.5%), poisoning (1%) and chemical burn (0.5%) respectively. The overall high rate of prevalence of child injury and major causes (burn, road traffic accident, occupational injury) suggest for launching preventive strategy. Further in depth studies are recommended.

Introduction:

Injury may be defined as, physical damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials such as heat or oxygen[1]. It is due to external cause may be intentional or unintentional. Injury is probably the most under recognized major public health problem facing the nation today[2]. Injury is a leading cause of death and disability in the world. According to World Health Organization (WHO), every year more than 5.8 million people die from injuries, with a rate of 97 per 100,000 populations. Of this, 3.9 million (128.6 per100, 000 population) are male and 1.9 million (66.7 per 100,000 population) are female[3]. A quarter of the deaths are due to road traffic accidents, 16 percent are suicides and 10 percent are homicides. Among all age groups, injury is the fifth leading cause of death in the world and accounts for 10 to 30 percent of all hospital admissions[4]. More than one-quarter of injury deaths occurred in South East Asia[5]. The burden of injury in developing countries is not new. Among the total disability-adjusted life-years (DALYs), 13% were due to injuries. Unintentional and intentional injuries contributed to three-fourth and one-forth of total DALYs, respectively. Among unintentional injuries, road traffic injuries (RTIs), falls and burns resulted in, respectively, 29%, 12% and 9% of total DALYs. In the intentional group, suicide and violence accounted for 41% and 43% of total DALYs, respectively. The WHO-World Bank Repot, which reviewed the disease transformation scenarios, indicates that RTIs will be the third leading cause of mortality by 2020, moving up from their present ninth position. Similarly, suicide and violence will move from the twelfth and sixteenth to tenth and fourteenth positions by 2020[6].

In Bangladesh, births and deaths are seldom recorded, making basic health indices such as causes and rates of death difficult to know with any real degree of certainty. However, basic data available from the Bangladesh Bureau of Statistics[5] and the Bangladesh Demographic and Health Survey[7] shows a steady decline in the Infant Mortality Rate (IMR) and the Under-Five Mortality Rate (U5MR). Recent evidence from the Demographic Surveillance System of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) shows a growing proportion of child deaths due to injuries. In 1983, nine percent of all deaths among 1-4 years children were due to drowning; by 2000 this had risen to 53 percent[8]. This shift indicates a sharp reduction in child mortality from

infectious diseases, with accidents and injuries now the major concern for child health in Bangladesh. It has been estimated that each year about 25,000 children die of injuries; and half of these children are under five years of age[9].

Injury accounted for 38 percent of all classifiable deaths in children aged 1-17. Injury caused 2 percent of infant deaths, 29 percent of 1-4 years old deaths, 48 percent of 5-9 years old deaths, 52 percent of 10-14 years old deaths and 64 percent of 15-17 years old deaths[10]. Fatal injury often occurs quickly and in Bangladesh most deaths from injury occur outside the hospital, with little direct economic costs for medical care. Non- fatal injuries, which result in hospitalization, have higher economic costs for medical care. Categorizing non-fatal injury by different severity levels allows comparisons of types of injuries at comparable levels of severity. This allows for the determination of factors such as social and economic burden of injury in a meaningful way. The nature of the injury and the physical forces involved in the two events differ, and the amount of trauma and severity of injury differs. By using the same level of severity of injury, it is possible to more directly compare injury from falls with injury from machines to determine the relative economic and social burden of each type of injury[10].

Materials and methods:

This was a cross sectional study done among the children aged up to 18 years (due to more vulnerability of this group to injury and at the same time they constitute a major portion of the whole nation), in a selected urban slum dweller in Dhaka city. The study was conducted among the children living in Korail slum, near gulshan lake, Banani (ward -19) within the period of March to June 2007. Cluster sampling technique was applied. All the children aged up to 18 years during the period of data collection were selected. A total of 486 sample were included in this study by using standard formula for estimating prevalence. A pre tested semi-structured questionnaire was prepared in such manner that all the variables were measured categorically and the relevant data can be collected. After completion of data collection, data were checked meticulously, verified thoroughly and edited carefully. Data were analyzed as per the objectives of the study. Statistical analysis including generation of frequency table, computation of mean, median, standard deviation were done with the help of the computer Statistical Package for Social Science (SPSS).

Results:

The total number of children aged 18 years and below in the surveyed house-holds was 280. Of them 121 were injured during the last 12 months. The prevalence of injury is therefore 43.2% or 432 per 1000 (Fig.1).

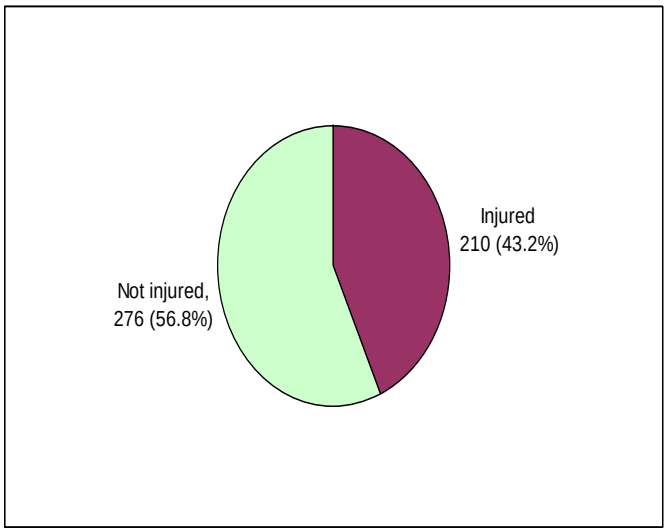

Figure 1: Prevalence of injury among children aged 18 years and below (N = 280)

Table 1 shows that out of 25 under 5 children, 14(56%) were male and 11(44%) female. Distributions of male and female in the age group 5 – 10 and 10 – 15 years were almost equal. However, in the age group 15 or above 15, all the children were male. Age distribution was almost identical between the sexes (p = 0.716).

Table 1 Distribution of the injured children by age and sex (n = 210)

Age (yrs)	Sex		Total
	Male (n = 108)	Female (n = 102)	
< 5	14(55.0)	11(44.0)	25
5 – 10	42(51.2)	40(48.8)	82
10 – 15	47(48.0)	51(52.0)	98
15 – 18	5(100.0)	0.0	5
Mean ± SD p-0.716	**8.9 ± 3.8**	**8.7 ± 2.9**	**210**

*** Student t-Test was done to analyze the data.**

Table 2 Shows out of 210 injured, 52 children were below 6 years of age for whom education does not apply. So, educational level applies for the remaining. Out of 158 injured, 61(39%) did not have any formal education, while the rest 97(61%) were primary level educated (Table 6).

Table 2 Distribution of the injured by education (N = 158)

Level of education	Frequency	Percentage
Illiterate	61	38.6
Primary	97	61.4

Note: 52 injured below 6 years were excluded

Table 3 shows that out of 51 under 5 children, 25(49%) were injured. Similarly the injury rates in 5 – 10 years, 10 – 15 years and 15 or above 15 years of age were 44%, 41% and 35% respectively. Thus the highest injury rate was observed among children below 5 years and the lowest among those aged 15 – 18 years. However, variations in age specific injury rates were not remarkable (Fig. 4).

Table 3 Age specific injury rate among the study population

Age (yrs)	Children upto 18 years		Age specific rate of injury
	Total number	Number injured	
< 5	51	25	49.0
5 – 10	186	82	44.0
10 – 15	236	98	41.5
15 – 18	08	03	37.5
Total	**486**	**210**	**43.2**

Table 4 shows that injury rate did not vary at all with respect to sex each group having the same rate of 43%.

Table 4 Sex specific injury rate among the study population

Sex	Children below 18 years		Sex-specific rate of injury
	Total number	Number injured	
Male	250	108	43.2
Female	236	102	43.2
Total	**486**	**210**	**43.2**

Table 5 shows the cause of injury by age. Over 90% of the burn occurred between 5 – 15 years of age (41% between 5 – 10 years and 49% between 10 – 15 years) and the rest (10%) in under 5 children. Road accident also most frequently occurred among 5 – 15 years age group (50% in 5 – 10 years and 38% in 10 – 15 years). Over two-third (69%) of the occupational injury was observed in 10 – 15 years, 20% in 5 – 10 years and 11% in 15 or above 15 years of children. Animal bite too was predominant in 10 – 15 years age group followed by 33% in < 5 years and 22% in 5 – 10 years age group. Other causes of injury were too few to calculate age specific causes.

Table 5 Distribution of respondents by age-specific cause of injury

Cause of injury	Age (yrs)				Total
	< 5 (n=25)	5 – 10 (n=82)	10 – 15 (n=98)	15-18 (n = 5)	
Burn	7(9.3)	29(41.4)	34(48.6)	0(0.0)	70
Road accident	5(8.3)	30(50.0)	23(38.3)	2(3.3)	60
Occupational injury	0(0.0)	7(20.0)	24(68.6)	4(11.4)	35
Fall on street	4(23.5)	6(35.3)	7(41.2)	0(0.0)	17
Animal bite	3(33.3)	2(22.2)	4(44.5)	0(0.0)	09
Fall from roof	0(0.0)	3(100.0)	0(0.0)	0(0.0)	03
Drowning	2(50.0)	1(25.0)	1(25.0)	0(0.0)	04
Fall from tree	3(33.3)	1(16.7)	3(33.3)	0(0.0)	06
Electric Burn	1(33.3)	2(66.7)	0(0.0)	0(0.0)	03
Poisoning	0(0.0)	1(50.0)	1(50.0)	0(0.0)	02
Chemical burn	0(0.0)	0(0.0)	1(100.0)	0(0.0)	01

Table 6 shows the cause of injury by sex. Among the males road accident was the commonest cause of injury (44%), where as among the females burn was found to be the predominant cause of injury (59%). Occupational injury (18% in male and 16% in female), fall on the street (9% in male and 7% in female) and animal bite (6% in male and 3% in female) 3rd, 4th and 5th ranking order respectively. Other negligible causes were fall from roof, drowning, fall from tree, poisoning, electric burn and chemical burns.

Table 6 Distribution of children by sex-specific cause of injury

Cause of injury	Sex		Total	
	Male (n = 108)	Female (n = 102)	No.	%
Burn	10(9.3)	60(58.8)	70	33.3
Road accident	47(43.5)	13(12.7)	60	28.6
Occupational injury	19(17.6)	16(15.7)	35	16.6
Fall on street	10(9.3)	7(6.9)	17	8.1
Animal bite	6(5.6)	3(2.9)	09	4.3
Fall from roof	2(1.9)	1(1.0)	03	2.9
Drowning	4(3.7)	0(0.0)	04	1.9
Fall from tree	5(4.6)	1(1.0)	06	1.4
Electric Burn	2(1.9)	1(1.0)	03	1.4
Poisoning	2(1.9)	0(0.0)	02	1.0
Chemical burn	1(0.9)	0(0.0)	01	0.5

Table 7 Shows majority of the injuries was caused accidentally. Only 2(1%) injuries were self-inflicted and 4(2%) were of other natures (Table 13).

Table 7 Distribution of the participants by nature of injury (n = 210)

Nature of injury	Frequency	Percentage
Accidentally	204	97.1
Self-inflicted	02	1.0
By others	04	1.9

Table 8 demonstrates the vehicles used by the participants to commute to different places. Nearly 90% of the participant used to commute by Rickshaw and 9% by boat and 2% by other means.

Table 8 Vehicles used to commute to different places (n = 121)

Commuted by	Frequency	Percentage
Rickshaw	187	89.1
Boat	19	9.0
Others(Bus,Taxi)	04	1.9
Total	210	100

Discussion:

The present study showed that the prevalence of injury in children in urban slum was 43.2%. BHIS demonstrated an overall child injury rate of 1592/100,000 children. This means that 2 in every hundred children are injured significantly enough to require medical care or lose three days of school or work in the years[11]. A cross sectional survey recently conducted in a rural area on 6,48,455 populations showed that mortality and morbidity rate due to injury were 13.4% and 30% respectively. Drowning was the most significant cause of death in their study.[3] In another survey 16% parents informed that their children had at least one injury in the last 12 months. The higher prevalence of injury in the present study might be that the study was conducted in children of urban slums who were frequently exposed to burn and road traffic accident. This reason becomes more evident as we discuss the causes of injury.

Out of 210 injured children one-third (33.3%) was caused by burn, while 60(28.6%) were caused by road traffic accident. Thus over 60% of the injuries in the children living in urban slums are caused by these two causes. Age specific injury rate reveals that almost half of the injuries occurred among under 5 children and as the age advances, the chances of injury decreased and at the age of 15 or over 15 it reduces to 38%, although, the rate of injury did not vary in terms of sex. From the age-specific causes of injury it is seen that burn and occupational injuries were more common in 10 – 15 years age group, where as road accident was more frequent in 5 – 10 years age group. Sex-specific cause of injury demonstrates that female children were more vulnerable to burn (58.8%) than their male counterpart (9.3%), while males were more so to accident (43.5%) than the females (12.7%). A study conducted to extend our knowledge of age and gender-specific injuries and to identify the risk groups and risk factors to formulate a preventive strategy. The study showed that in the age group 1 – 17 boys have been injured significantly more often than the girls (17.9 vs. 14%). Two- thirds accidents among toddlers were domestic accidents where as leisure and sport accidents were most prevalent in children and adolescents aged 5 – 14 years (32.1%) which bears consistency with the findings of the present study. The proportion of accidents in child care facilities and educational institutions tripled from infancy (10.9%) to school age (28.7%) as traffic accident (5.6% - 16.7%). The study identified three most frequent injury mechanisms in the age range 1 – 17 years were falls on the level ground, falls from height and accidents.[7] The present study however, identified burn as the most significant cause followed by road accident and occupational injury. The reason of such difference might be that the two studies were conducted in different socio-demographic and geographic background. A population based survey conducted over 15000 population encompassing both urban rural areas (8,188 urban and 7035 rural residents) showed that rural residents were more likely to experience injuries due to falls (OR = 1.6; 95% CI = 1.1 – 2.3) and cuts

(OR = 4.3; 95% CI = 3.0 – 6.2) but had lower risk of transport injuries and falls[8].

Conclusion:

Child injury is a public health menace in Bangladesh. It is a significant cause of morbidity although most of the injuries can be prevented if proper preventive strategy is adopted from all concerned. This involves proper identification of risk groups and risk factors as well as the context in which the injury occurs and the mechanism by which injury takes place. The present study was conducted in a small slum area which does not represent a cross-section of urban population and as such the result cannot be generalized to formulate an action oriented strategy to contain the problem in the community. Further study using a stratified sampling technique could be undertaken to include a representative urban population and the result obtained from such study might have policy implications

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