Bangabandhu Sheikh Mujib Medical University Journal 2022;15(4):16-21 bsmmu.edu.bd

Original Article

Epidemiology of injury related disabilities in a selected district in Bangladesh: A cross-sectional study

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Abstract

Globally more than a billion people are living with disabilities. Injuries are one of the major causes of disabilities. A cross-sectional survey was conducted in 2009 to explore the epidemiology of injury-related disability in a district of Bangladesh. A total of 37,039 populations were interviewed in 8905 households both in the urban and rural area. Overall prevalence of injury-related disability was found 6.8 per 1000 population. Significantly higher rate was observed in the rural area compared to urban. Compare to female the rate was found significantly higher among male (8.5; 95% confidence interval: 7.3-9.9), compared to female (5.0; 95% CI: 4.1-6.2). Rates were found to increase with age, the highest prevalence was found among 60 years and above age group where the rate was 24.3 (95% CI: 19.0-30.6) per 1000 population. Compare to literate people illiterate people were found more vulnerable (odds ratio 3.1; 95% CI 1.7-5.9). The prevalence among illiterate was 13.4 (95% CI: 11.1-16.1) per 1000 population, and it was 3.8 (95% CI: 2.0-6.5) among higher secondary & above education level population. Falls caused more than 32% disabilities. Road traffic injuries, cuts, machine injuries, burns, and violence were the other common causes of injury disability. About 30% of the people identified with an injury-related disability mentioned that they don't use public transports, and 65% of them mentioned this is because of their disability. About 37% people reported that they had lost their job because of the disability. Injury share the significant cause of disability in Bangladesh. Fall, road traffic injury and cuts are the common causes of injury-related disabilities.

Keywords: Injury, disability, fall, road traffic injury, Bangladesh

INTRODUCTION

As a result of epidemiological transition, injury has become a major cause of disease burden in the world, especially in low and middle-income countries.[1] It has been estimated that more than 5 million deaths occur due to injury every year and it accounts for 10% of global mortality.[2] Globally more than a billion people are living with disabilities, the majority of them live in low-income and middle-income countries where a significant proportion of disabilities are due to injuries and violence.[3] The interaction between injury and disability has not been well depicted in literature except traumatic brain injuries and mental disorders. However, among many other causes, injury was found as a major cause of disabilities, in some of the countries more than one-quarter disabilities caused by injuries and violence.[4,5] Road traffic injuries, falls, burns, and acts of violence, war and conflict are the major causes.[5] Unintentional injuries resulted in 138 million disability-adjusted life years (DALY) lost every year which also constitutes 9% of the global DALY lost, which causes a large number of family members suffering from lifelong disabilities and socio-economic losses.[6] Physical and/or cognitive limitations due to neurotrauma, paralysis due to spinal cord injuries, partial or complete amputation of limbs, physical limb deformation resulting in mobility impairments, sensory disability such as blindness and deafness are the different form of disabilities can occur from injuries.[5] There is an important gap in knowledge on what proportion of disabilities are caused by injuries, especially in the low-income country setting. Understanding the potential impact of injury prevention on the overall burden of disability is valuable in designing an effective health

Received: 01 Dec 2022; Revised version receiving: 03 Jan 2023; Accepted: 04 Jan 2023; Published online: 31 Jan 2023
Supplemental file, and peer review and author response: available at DOI: https://doi.org/10.3329/bsmmuj.v15i4.63892

Highlights

1. **Injuries are one of the major causes of disability in Bangladesh.**
2. **Fall and road traffic injuries are the common mechanism related disabilities.**
3. **Rural and illiterate people are more vulnerable compared to urban and literate.**

care system.

In Bangladesh, the routine health management information system is not well equipped to estimate the contribution of injury to disability. Household surveys are the main sources of information on disability and its causes. We have some information on the overall prevalence of disability in Bangladesh, [7-9] however, information on the injury-related disability is almost absent. This study has been designed to document the epidemiology of injury-related disability in a selected district of Bangladesh. The information will help to understand the magnitude and nature of injury-related disability in Bangladesh.

METHODS

It was a cross-sectional survey, conducted in Manikganj district of Bangladesh, located around 65 km north-west of the capital city, Dhaka. The survey was conducted during July-December 2009.

Briefly, both urban and rural areas of the district were included in this survey. Non-institutional residents of all ages in the district were eligible for this survey. A total of 9450 households were targeted to get a sample of 40,000 populations. We considered the prevalence of disability 1% and .5% margin error in calculating the sample size. The detail of the survey methodology has been described elsewhere.[10]

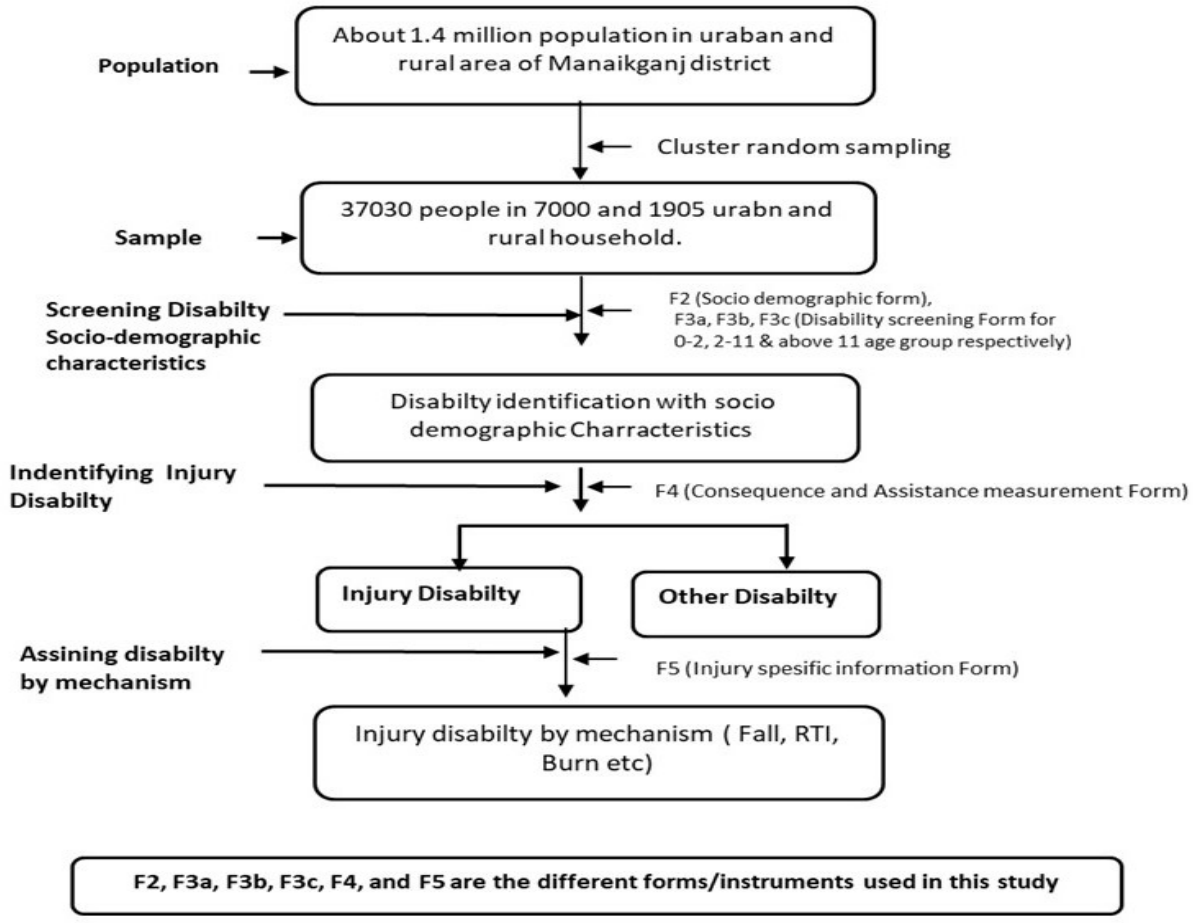

FIGURE 1 Methodological flowchart

Data were collected at household level by face to face interview and observation. Twenty data collectors, five supervisors, and one data managers were involved in this process. They were trained on the concept of disability and injury, data collection procedure and quality control at the Centre for Injury Prevention and Research, Bangladesh (CIPRB) for seven days.

Three different set of questionnaires were used in this study for different age group, 0–1 years, 2–10 years and for 11 years or older age groups to identify the disability cases. Ten Questions (TQ) Screen for Child Disability instrument was used for the first two groups. For the 11 years and older group, an instrument was adapted which was piloted by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and the World Health Organisation (WHO) in a study on Health and Disability Statistics[11].

A different set of questionnaire was also used when the cause of disability was an injury. The information on the external causes of injury, place of injury, type of injuries was collected using a pre-tested instrument which was developed based on the questionnaire used in Bangladesh Health and Injury Survey in 2003.[12] The injury was assigned as a cause of disability if the person experienced any of the following mechanism prior to the development of disability. The injury mechanisms were: fall, burn, cut, transport injuries, drowning, electrocution, falling object injuries, machine injuries, violence, poisoning, suicidal attempts, animal bite/ injuries, and foreign body entering into or through the eyes or natural orifices.

Data analysis

The prevalence of injury-related disabilities was calculated taking a total number of persons identified with an injury-related disability as the numerator, and all population screened for disability as the denominator. The procedure for disability measure has been described elsewhere[10].

Further analysis was carried out according to injury mechanism, according to income contribution for the family and necessity of assistance in their daily life activities. Logistic regression was carried out to see the effect of age, gender, literacy and place of residence. Both crude and adjusted Odds Ratio was calculated with 95% confidence interval. The prevalence was calculated per 1,000 populations with 95% confidence interval (CI).

Ethics approval and consent to participate

Bangladesh Medical Research Council provided Ethical approval for this study. We also took permission from relevant administrative units of the surveyed district. Verbal consent from individual respondents was obtained. Assent, in case of children, were taken from their parents.

RESULTS

About 20% respondents were from urban areas, and about half (50.1%) of the respondents were female. About 62.6% respondents were of working age (15–59 years), and 7.6% were from the oldest age group (60 years or older). About 30% were from the youngest age group (0–14 years). Detail population characteristics have been described elsewhere.[10]

The overall prevalence of injury related disability was found 6.8 per 1000 population. The rate was found significantly higher in the rural area compared to urban. Urban and rural rates were 4.5 (95% CI: 3.2-6.3) and 7.4 (95% CI: 6.4-8.4) per 1000 population respectively. The significantly higher rate of disability was found among male population compared to female. Rates among male and female were 8.5 (95% CI: 7.3-9.9) and 5.0 (95% CI: 4.1-6.2) per 1000 populations. Rates of disability were found to increase with increasing age, the highest prevalence found among 60 years and above age group where the rate was 24.3 (95% CI: 19.0-30.6) per 1000 population.

Compared to literate people, the prevalence of injury related disabilities was found significantly higher among illiterate people. The rates were 13.4 (95% CI: 11.1-16.1) and 3.8 (95% CI: 2.0-6.5) per 1000 among illiterate population and population with higher secondary and above education respectively. The retired and unemployed population has been suffering from injury related disabilities in significantly higher rates than the people with other occupation.

An estimated one million people suffer from disabilities due to injuries in Bangladesh considering the present prevalence rate **(Table 1)**.

TABLE 1 Prevalence (per 1000 population)* of injury related disability urban and rural people in Manikganj district of Bangladesh

Variables	Urban (n= 7293)	Rural (n=29737)	All (n=37030)
Age, years			
0-14	1.4 (0.4-3.8)	6.5 (4.4-9.2)	5.8 (4.0-8.1)
15-59	4.3 (2.6-6.5)	7.2 (6.1-8.5)	6.6 (5.6-7.7)
60 or above	23.0 (11.8-40.7)	24.6 (18.4-31.5)	24.3 (19.0-30.6)
All ages	4.5 (3.2-6.3)	7.4 (6.4-8.4)	6.8 (6-7.7)
Sex			
Male	6.5 (4.2-9.6)	9.0 (7.6-10.7)	8.5 (7.3-9.9)
Female	2.5 (1.2-4.5)	5.7 (4.6-7.0)	5.0 (4.1-6.2)
Education Level			
Illiterate	12.1 (7.4-19.5)	13.7(11.2-16.7)	13.4(11.1-16.1)
Primary	4.7 (2.6-8.7)	5.9 (4.6- 7.7)	5.72(4.5-7.2
Secondary	2.4 (1.028 5.618)	6.4 (4.9-8.4)	5.6 (4.2-7.2)
Higher secondary or above	1.03 (0.2-5.8)	5.1 (2.8-9.4)	3.8 (2.0-6.5)
Not applicable	1.2 (0.2-6.9)	1.9 (0.9-4.1)	1.8 (0.9-3.5)
Occupation			
Agriculture	16.2 (6.9-37.4)	8.6 (5.9-12.6)	9.3 (6.5-13.1)
Business	2.9 (0.8-10.7)	9.2 (5.8-14.6)	7.6 (4.8-11.5)
Student	1.7 (0.6-5.1)	4.0 (2.7-5.9)	3.5 (2.4-5.0)
Housewife	3.3 (1.6-6.9)	6.8 (5.3-8.8)	6.1 (4.8-7.7)
Service	3.1(0.8-11.3)	5.8(3.0-10.7)	5.1(2.9-8.5)
Unemployed	5 (0.9-27.8)	25.2 (17.4-36.4)	22.0 (15.0-31.3)
Laborer	4.7 (1.3-17.1)	6.8 (3.8-12.3)	6.4 (3.6-10.7)
Retired	38.2 (17.6-80.8)	33.3 (21.7-50.9)	34.4 (23.0-49.2)

*Figures in the parentheses are 95% confidence intervals

Fall injury was found as the major cause of injury related disability which constituted 32% of the total. Road traffic injury was found as the second largest cause and accounts for about 13% injury related disabilities. The cut injury was found as the third leading cause and constituted about 12% of the disabilities. Machine injury, burns, animal injury and violence, were found as the other causes of injury related disabilities. Road traffic injury was found higher among male and fall was found higher among female. **(Figure 2)**.

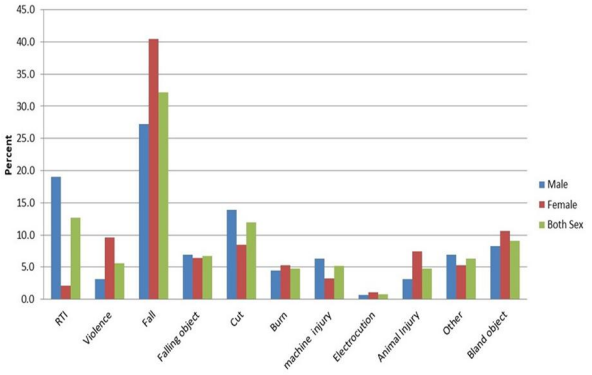

FIGURE 2 Percentage of disabilities by sex and injury mechanism

About 40% of the people with injury disabilities needed assistance in their daily life. About 36% people needed assistance in their movement, and about 14% needed assistance in communication. About 30% of the people identified with injury related disability don't use public transports 65% of them mentioned that this is because of their disability. About 37% of the respondent mentioned that they were previously on the job but now unemployed because of their disability. (Table 2)

TABLE 2 Distribution of injury related disability according to consequences

Consequences	Number	Percent
Need assistance in daily life (n=252)		
No	152	60.3
Sometime	60	23.8
Always	40	15.9
Need assistance in movement (n=252)		
No	161	63.9
Sometime	59	23.4
Always	32	12.7
Need assistance in communication (n=252)		
No	216	86.1
Sometimes	26	10.4
Always	10	4.0
Use public transport (n=252)		
Yes	176	69.8
No	76	30.2
Job lose (n=118)		
Yes	74	62.7
No	44	37.3

About 50% of the injury related disable people were found as the income earner for their families. More than a quarter of the people with injury related disability were found as the main income earner for their family.

Age, sex, literacy and place of residence were found as the contributory factors for injury related disabilities. Risk of injury related disabilities found significantly higher (OR 3.1; 95% CI 1.7-5.9) among the illiterate population, risk reduced as the level of education increased. Higher the age increases the risk of disabilities, about 5 times higher risk found among 60+ age group (OR 5.1; 95% CI 3.0-8.4). Males were found more vulnerable for injury related disabilities, the risk of disability found about 2 times higher among male (OR 1.9; 95% CI 1.4-2.4) compared to females. The rural population was found more vulnerable compared to the urban (OR 1.5; 95% CI 1.0-2.1) **(Table 3)**.

TABLE 3 Factors associated with injury related disabilities

Factors	Odds ratios (95% confidence intervals)	
	Crude	Adjusted
Sex		
Female	1	1
Male	1.7 (1.3-2.2)	1.9 (1.4-2.4)
Area of residence		
Urban	1	1
Rural	1.6 (1.1-2.4)	1.5 (1.0-2.1)
Age, years		
0-14	1	1
15-59	2.3 (1.6-3.4)	1.7 (1.1-2.7)
60+	8.6 (5.7-13.2)	5.1 (3.02-8.4)
Education		
Higher secondary school or above	1	1
Illiterate	7.3 (3.6-15.1)	3.1 (1.7-5.9)
Primary school	3.1 (1.5-6.5)	1.9 (1.0-3.6)
Secondary school	3.0 (1.4-6.4)	1.7 (0.9-3.2)
Education not applicable	2.1 (0.8-5.1)	1.0 (0.4-2.7)

DISCUSSION

Injury is a major cause of disabilities in Bangladesh more than a million people in Bangladesh suffer from some form of disabilities due to injuries. Injuries constituted about seventeen percent of the total disabilities in Bangladesh.[10] Similar trend was observed in many other countries in the world in Mexico it was 17.7%, it was 12.7 and 14.3 in Hungary and Sierra Leone.[5] In Nepal injury contributed 11% of the total disability. [13]

Rural people were found more vulnerable compared to urban, about 1.5 times higher risk was observed among rural population compared to urban. A similar trend was observed in overall disability prevalence in other studies in Bangladesh.[10] Literacy was found as a protective factor for injury related disabilities. Risk of having injury related disabilities was found significantly higher among the illiterate population (OR 3.1; 95% CI1.7-5.9). A similar pattern was observed in other regional countries.[14,15] Age was found as another risk factor, people 60 years or above found the most vulnerable group for injury related disabilities, this fashion also observed in overall disability prevalence in Bangladesh.[10] Globally, falls, road traffic injury, burn, violence and war are the major causes of injury related disabilities.[5] Findings of this study were found consistent with the global findings. Falls found as the major cause of injury disabilities in this study as about one-third injury related disabilities were due to fall injuries. Road traffic injuries, cuts, burns and violence were found as other common causes. Although the overall rate of injury disability was found higher among male, fall-related injury disability found higher among female.

Disability affected the people's lives in many ways including medical, social and economic conditions.[16] A considerable proportion of the people with injury disabilities need assistance in their daily life activities. A substantial number of people with disability are unable to use public transport because of their disabilities. Household financial situation goes down when an adult become unemployed because of their health condition. It was also found in a study that people cope with this financial condition by reducing expenditure, taking loan or mortgage, selling assets changing work and begging.[17] In this study, more than one-third of the people who were previously employed had become unemployed because of their disability. About 50% population who were suffering from injury related disabilities were found as the income earner for their family. About 27% of people were the main income earner. Although we did not explore the financial consequences of injury related disabilities, we can understand the magnitude of the problem in relation economic condition.

In this study has some limitations, disability was documented on the subjective responses of parents of the children or respondents themselves. The final estimate of disability can be influenced because of the method. The visual analogue scale (VAS) was used in measuring the severity of problems, over or underestimate of can be done by the respondent, which ultimately can also affect the final estimate.

Conclusion

Injuries are a major cause of disability. Fall, road traffic injury and cut injuries are the common causes of injury related disabilities. Prevention programmes should pay higher attention to the modalities of injury.

Acknowledgments

The Centre for Injury Prevention and Research Bangladesh with technical support of WHO Country Office for Bangladesh conducted this study.

Author Contributions

- Conception and design: MMZ, SRM, AFR
- Acquisition, analysis, and interpretation of data: SRM, MM
- Manuscript drafting and revising it critically: SRM, MMZ, AFR
- Approval of the final version of manuscript: MMZ, SRM
- Guarantor of accuracy and integrity of the work: SRM

Funding

WHO Country Office for Bangladesh (Allotment No. SE BAN CCB 001 RB 08; SO 03; OSER 01; P05; A02 and AMS code: 6152453) provided the fund for conducting this study.

Conflict of Interest

The authors declare no conflict of interest.

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