

## Original article |

# UNINTENTIONAL INJURIES IN RURAL AREA - A COMMUNITY BASED STUDY IN RURAL BHOPAL

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## ABSTRACT

**Background:** Unintentional injuries within the home environment have not so far been recognized to the same extent as traffic and work-related injuries in India, largely because they have not been effectively counted. This study took place in the area under PHC Ratua of district Bhopal, India aiming to determine the profile of unintentional injuries.

**Methods:** All the inhabitants of 11 villages within 5 kms. from the centre formed the study population (13,587). One family member preferably the head was interviewed about their experience of injury in the preceding three months by trained personnel.

**Results:** 487 persons had a total of 543 new injuries during three months prior to the interview. Only 292/543 (53.7%) of the recorded injuries received medical care at health facilities. Home and road traffic injuries constituted the most common injuries with incidence rates of 27 and 24, respectively. Home injuries were most common among young children and the elderly. Majority of the injuries were attributed to "cutting and crushing". Falls were the leading cause among the young (<15 years) and the old (above 60 years).

**Conclusion:** The findings suggest that greater attention needs to be directed toward the prevention of injuries occurring in the home. A larger study in terms of size as well as duration (at least one year) is needed to characterize the patterns of unintentional injuries in more detail, including any seasonal variation.

**Key words:** community-based, surveillance, unintentional injury, India.

## BACKGROUND

Indirect estimates by the World Health Organization (WHO) and the Global Burden of Diseases Study (GBD) suggest that unintentional injuries account for 3.9 million deaths worldwide<sup>1</sup>. 90% of these occur in low- and middle-income countries. The majority of these deaths is attributable to road traffic injuries, falls, drowning, poisoning and burns<sup>1</sup>. The World Bank has estimated that 12% of the total loss of "disability adjusted life years" (DALYs) worldwide is the result of injuries<sup>2</sup>. Injury is the most common cause of death and permanent disability in the age group 1 - 40

years in industrialized countries and is becoming common also in economically less developed countries. WHO estimated that about 0.8 million deaths in India were due to unintentional injuries in 2004<sup>1</sup>. Direct Indian estimates of unintentional injury deaths relying on annual National Crime Records Bureau (NCRB) reports of injury deaths from police records showed only 0.3 million injury deaths in 2005<sup>3</sup>. But police records are subject to under-reporting and misclassification<sup>4-6</sup>. Other sources of mortality data from selected health centres in rural areas<sup>7</sup> and selected urban hospitals<sup>8</sup> are not representative of the population of India, and have other methodolog-

ical limitations<sup>9</sup>. Studies on the magnitude of injuries and the groups at risk have been conducted world-wide, especially in developed countries. Hospital based studies, which are commonly reported from developing countries, presumably provide a representative picture of the prevalence and incidence of serious injury, but only a partial picture of the circumstances in which injuries occur. Given the limited access to hospital care in poor countries, however, data based on health facility data are not likely to be representative. In contrast, population-based studies are costly and rarely carried out particularly on topics such as injury, which are not high on the public health agenda in developing countries at present. In order to understand the epidemiology associated with nonfatal injuries; we conducted a community-based study in a rural location of Bhopal.

## METHODOLOGY

A cross-sectional community based survey to collect data on non-fatal unintentional injuries was conducted in 11 villages under PHC Ratua, Bhopal from July to September, 2009. The study was conducted in field practice area of Rural health Center, Ratua, under the department of Community medicine, PCMS & RC, Bhopal. Villages within the 5 km radius from the center were selected using convenient sampling. A total of 11 villages were selected. All the individuals in these 11 villages were included in the study. There were a total of 13,587 study subjects in these villages. Permission from the Institutional ethical committee was sought. All cases of unintentional non-fatal injuries occurring in the three months preceding the date of interview were recorded after their informed consent. The study excluded intentional injuries such as suicide, suicide attempt, homicide, and violent assault. The questionnaire included details such as place of injury, etiology, and victim's activity at the time of injury according to the NOMESCO classification<sup>10</sup>. Interviewers were given additional training with respect to the injury questions and performed the interviews in the respondents' homes. Heads of the households were asked whether any household member had sustained any non-fatal injury in the last three months, with the intention of interviewing each injury victim individually. If the injury victim was not at home or was a child (0 - 14 years old), the head of the household or a household member who knew most about the injury was inter-

viewed as a proxy respondent. To assess the reliability of collected information 5% of the study population, randomly selected, were re-interviewed. Almost all of the original data were found to be reliable.

The following definitions were used in this study. *Injury* denotes the somatic medical consequences of an accident. An *accident* is defined as "a sudden, unexpected series of undesired occurrences in the interplay between individual and environment which lead to personal injury"<sup>11</sup>. The definition excludes intentional injuries. Unintentional injuries included road traffic accidents, poisonings, falls, burnings, scaldings, drownings, and submersions, and accidents caused by machinery, cutting and piercing instruments, plus all other accidents including late effects, and drugs and medicaments causing adverse effects. An injury was included in the study when it was serious enough to meet any of the following conditions: need for any kind of medical care; need to stay in bed at least one day; or need to stop regular work or activity for at least one day after injury. Injuries were also categorized according to location and the main activity performed by the victim at the time of injury.

## RESULTS

The gender and age distribution of the study population of 3,736 households with 13,587 inhabitants are shown in Figure 1. The majority (68%) of the population were in the working-age group (15 - 59 years). The population ratio of males to females was 0.89:1. Of all members in the participating households only 1.5% refused to be interviewed; 487 persons had a total of 543 new injuries during three months prior to the interview (Table 1 and Figure 1).

**Table 1: Injury incidence rate (per 1000 person years), by age and gender with (95% CI)**

Age group	Male	Female	Total
0-4	65 (36-95)	47 (26-68)	59 (38-81)
5-14	124 (111-133)	43 (28-58)	77 (68-88)
15-34	98 (88-108)	45 (36-56)	75 (62-88)
35-59	79 (55-103)	77 (60-95)	85 (71-99)
60+	83 (53-113)	71 (48-93)	77 (56-99)
<b>Total</b>	99 (90-107)	53 (40-66)	75 (66-84)

Only 292 (53.7%) of the recorded injuries received medical care at health facilities. Those aged 35 - 59 years experienced a slightly higher

than average injury rate, followed by those aged 60 and above. Small children aged 0 – 4 had the lowest incidence rate. However, there were no

great differences between the age groups. Males had a higher injury rate than females.

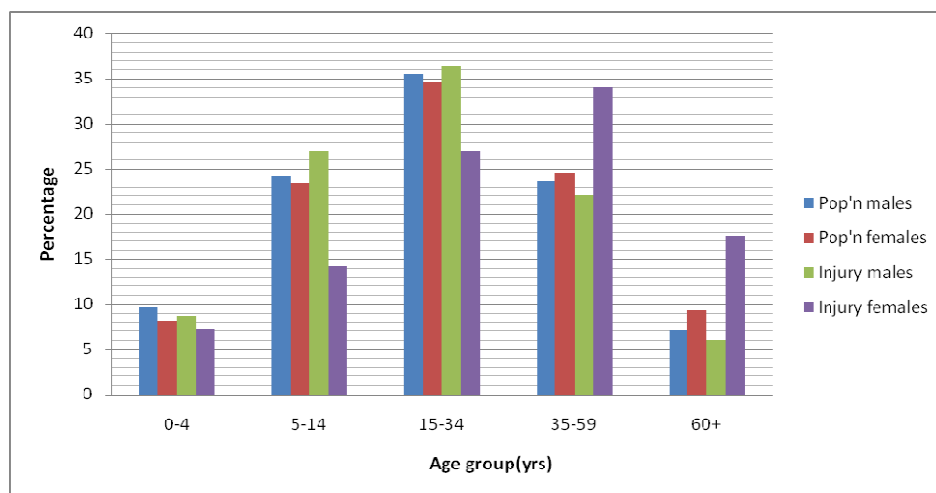


Fig. 1: Age and gender distribution of the study population and injury cases

Table 2: Injury incidence rate (per 1000 person years) (95% CI), by type of injury, age group and gender

Type of injury setting	Age group (95%CI)					Gender (95%CI)		Total
	0-4	5-14	15-34	35-59	60+	Male	Female	
Home	29 (18-40)	36 (21-50)	19 (14-24)	22 (16-30)	35 (22-49)	30 (22-38)	22 (15-29)	27 (20-34)
Road traffic	14 (6-25)	28 (14-42)	23 (16-30)	23 (14-32)	23 (13-34)	28 (22-33)	18 (13-24)	24 (18-29)
Work related	-	6 (0-13)	22 (15-30)	34 (28-40)	8 (2-14)	21 (16-27)	8 (3-14)	16 (12-20)
School	-	9 (1-19)	4 (0.7-8)	2 (0-4)	-	4 (2-7)	2 (0-4)	3 (1-4)
Others	7 (0-15)	13 (4-21)	12 (7-17)	5 (0-11)	4 (1-8)	14 (8-20)	7 (3-8)	9 (7-12)

Table 2 shows the incidence of injuries in different settings according to the place and the main activity performed by the victim at the time of injury. Home and road traffic injuries constituted the most common injuries with incidence rates of 27 and 24, respectively. Home injuries were most common among young children and the elderly. Among the home injuries, a variety of hazards were involved such as falls due to slipping on the floor or ground, or from stairs or trees (33%), cutting by a knife or by electric equipment such as a machine for cutting molasses (16%), burns and scalds by hot liquid (17%). The road traffic injury incidence rates were nearly the same in all age groups except for small children, who had a lower rate. Bicycles were involved in almost half of the cases of road traffic injuries (48%) and motorcycles in one-third while only one injured person (0.9%) crashed in a car. Among work-related injuries, cutting and crushing were the most common causes (51%). Cutting fingers accounted

for 35% of work-related injury cases, and were often related to male workers using labouring equipment. The purpose of the activity that the victim was engaged in at the time of injury is given in Table 3. The majority of the injuries were attributed to unpaid work such as cooking, household maintenance, caring for children, followed by working for income and road travel. The distribution of activity of injury victims was not different by gender except for the purpose of working for income. For all types of injury, the majority were attributed to "cutting and crushing" (Table 4). Falls were the leading cause among the young (<15 years) and the old (above 60 years). Cutting, crushing and being hit by contact with other objects were the most common mechanisms in working-age adults (age 15 – 59 years). Children aged 0 – 14 had the highest incidence rate of scalds. Scalds by hot liquid accounted for 73% of all burn cases.

**Table 3: Injury incidence rate (per 1000 person years) (95% CI) according to purposes of the activities in which victims were engaged at time of injury, by gender and purpose of activity**

Purpose of activity	Male	Female	Total
Unpaid Work	27 (21-34)	23 (13-33)	26 (19-33)
Working For Income	25 (17-28)	13 (7-20)	18 (15-21)
Road Travel	13 (11-19)	12 (8-16)	14 (9-19)
Play, Hobby & Other Leisure Activity	12 (7-15)	6 (3-8)	6 (3-10)
Sports, Exercise	6 (4-11)		4 (2-5)
Vital Activity	4 (1-6)	4 (2-6)	3 (2-5)
Educational Activity	5 (4-10)	1 (0-2)	4 (3-6)
Others	4 (2-8)	3 (2-7)	3 (3-6)
Total	99 (90-107)	53 (40-66)	75 (66-84)

**Table 4: Injury incidence (per 1000 person years) (95% CI), by mechanism of injury, gender and age group**

Mechanism of injury	Age group (yrs)				Gender		Total
	0-14	15-34	35-59	60+	Male	Female	
Cutting, Crushing etc	14 (10-19)	32 (24-39)	25 (17-34)	23 (12-33)	32 (25-38)	19 (12-25)	26 (20-33)
Hit By Contact With Object etc	22 (15-29)	23 (17-28)	31 (23-39)	16 (7-24)	33 (27-39)	13 (11-16)	24 (19-28)
Fall	23 (16-30)	16 (11-22)	20 (11-30)	33 (27-39)	23 (18-29)	21 (17-24)	22 (18-26)
Burn & Scald	7 (4-11)	3 (1-5)	3 (0-6)	3 (0-6)	5 (2-6)	4 (2-6)	4 (3-6)
Others	1 (0-2)	1 (0-2)	3 (0-6)		1 (0-3)	2 (0-3)	2 (0-4)

## DISCUSSION

The aim of this population-based pilot study was to explore the potential of community-based interviews as a tool for describing the epidemiological pattern of injuries in rural Vietnam. Overall there were 75 nonfatal injuries/1,000 person-years, which was lower than rates found in some other recent studies in developing countries. For example, Rahman et al. found a higher injury incidence of 311/1,000 person years from a household survey, but using 15 day recall, in Bangladesh and suggested that minor injuries may have been overestimated<sup>12</sup>. Gordon et al. (1959) reported an injury incidence of 116/1,000 person-years in four Indian villages<sup>13</sup>. In a similar household survey of injury in Ghana, Mock et al. found an injury rate of 78/1,000 person-years using one-year recall<sup>14</sup>. Latin American injury studies combined institutional recording with household surveys and found 60 injuries per 1,000 people per year in Cuba, 220 in Venezuela and 303 in Chile<sup>15</sup>. An American National Health Survey in 1979, which included questions on injuries, found 345 injuries per 1,000 per year<sup>16</sup>. Owing to the wide variation in socioeconomic status of different study populations and the likely variations in risk exposure, it is difficult to make meaningful comparisons between different settings. Definitions of severity criteria for injury cases may vary from study to study. From this pilot study, it was possible to characterize interesting patterns of injury in the community, in-

cluding many injuries not presenting at health facilities. Inevitably the question of recall bias arises in this type of study, in this case over the three-month period relating to each interview. Since this is a community based study it provides a better picture of the pattern of injuries in the community than a hospital based study. However, the greatest limitation is the short time-period, raising questions about seasonal variations.

## CONCLUSION

The findings suggest that greater attention needs to be directed toward the prevention of injuries occurring in the home. A larger study in terms of size as well as duration (at least one year) is needed to characterize the patterns of unintentional injuries in more detail, including any seasonal variation.

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