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Epidemiological study of road traffic accident cases in emergency department of tertiary care centre of Eastern Nepal

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ABSTRACT

Background: Road traffic accidents (RTAs) pose a major challenge to emergency with often a need for multidisciplinary approach. Recent times have seen an increasing trend of this modern epidemic, especially in low economy countries. The objectives of the study were to estimate the proportion of RTA-related injuries in the emergency department of a medical university in Eastern Nepal and describe the patient profile.

Materials and Methods: A hospital-based cross-sectional study was carried out in the Emergency Department, BPKIHS, Eastern Nepal, from January to December 2012.

Results: More than half (53%) of the RTA victims were 20–40 age group with a male-to-female ratio of 2.2. The most common season for the occurrence of accidents was spring (35.7%) and the most common weekday was the weekends (30%). Two wheelers were the most common vehicles involved (80%). Fractures of lower limbs were the most common diagnosis. Bad prognosis showed an association with triage score (P = 0.001), alcohol consumption (P = 0.001), and type of vehicle (P = 0.001).

Conclusion: The people of the most active and productive age groups are involved in RTAs. Majority have secondary level and above by literacy status. The accident rates were higher in male than female groups. Road accidents were more common in winter and spring.

Key words: Emergency, Nepal, road traffic accident

BACKGROUND

Road traffic accident (RTA) is the eighth leading cause of death globally[1] and is estimated to rise to the top five by 2030.[2] Approximately 90% of the estimated 1.2 million death occur in low-income and middle-income countries. Compared to high-income countries, there has been no reduction in the number of RTA in low-income countries, especially the Southeast Asia region. The problem is increasingly being identified as a major public health problem.[3]

Nepal is a small country in developmental transit with improving infrastructure including road building and facilities but that is not in keeping with population increase from 23.2 million in 2001 to 26.6 million in 2011 and a high rate of vehicle registration that jumped by 325%.[4,5] A majority of this registration vehicle in Nepal is two wheelers (85%) which are comparatively unsafe.[6]

RTA is a major and frequently encountered problem in the emergency department of Eastern Nepal. Literature review reveals little baseline data on the problem. This study planned to estimate the proportion of RTA presenting to BP Koirala Institute of Health Sciences, a Medical University in Eastern Nepal and a referral center for the region. We further planned to describe the sociodemographic profile and type of injuries sustained by the patients of RTA.

MATERIALS AND METHODS

This is a hospital-based prospective cross-sectional study. The data were collected from the Department of General Practice and Emergency Medicine at BP Koirala Institute of Health Sciences from January 1 to December 31, 2012.

RTA was defined as an accident which took place on the road between two or more vehicles or a vehicle and a living person, one of which had to be any kind of a moving vehicle. Any injury on the road without involvement of a vehicle (e.g., a person slipping and falling on the road and sustaining injury) or injury involving a stationary vehicle (e.g., person getting injured while washing or loading a vehicle) were excluded from the study. Patients not willing to participate in the study were also excluded from the study. Informed consent was taken from the participants and from accompanying persons when the patient was not able to communicate/unconscious. A pre-tested pro forma designed for the study was used for data collection. The patients who presented

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with a history of RTA as defined earlier formed the sampling frame. Interview-based method was used.

The patients were triaged based on Australasian triage score which is a five-tiered score system, score of 1 being most urgent. Other variables studied were demographic variables, delay to care, seasonal distribution, and relevant clinical details including alcohol intake.

The data recording and analysis used Microsoft Excel and SPSS software. Data were presented in proportion and percentage. Tests of significance used Chi-square test. Test was considered significant at 0.5%.

RESULTS

According to the medical record section, 22,200 cases presented to emergency over 1 year. Injury-related diagnosis constituted more than one-third (38%) of this cohort. RTA formed 15.7% of total injuries and 4% of total emergency attendance.

The age group showed a predominance of young population aged 20–40 years (53%). Male:female ratio was 2.2. Hilly Janjati from the region was the most common ethnicity (50%). Education level of secondary level and above was the most common (69%). By religion, Hindu was the most common (63%) [Table 1].

The most common season for RTA was spring (March, April, and May) (35.7%) [Figure 1]. By weekdays, accidents were more frequent during Friday (17.2%) as compared to rest of the days of the week [Figure 2].

Table 1: Sociodemographic profile of study population (*n*=900)

Characteristics	Frequency (%)
Age (years)	
<15	100 (11.1
15–19	84 (9.3)
20–29	307 (34.1
30–39 years	174 (19.3)
40–49 years	114 (12.7)
50–59 years	59 (6.6)
More than 60 years	62 (6.9)
Ethnicity	
Brahmin/Chhetri	265 (29.4)
Hill Janjati	449 (49.8)
Terai Janjati	186 (16.6)
Dalit	38 (4.2)
Occupation	
Agriculture	82 (9.1)
Labor	326 (36.2)
Student	391 (43.4)
Homemaker	101 (11.2)
Religion	
Hindu	564 (62.7)
Buddhist	86 (9.6)
Kirati	202 (22.4)
Christian	30 (3.3)
Muslim	18 (2.0)
Literacy status	
Illiterate	56 (6.2)
Primary level	222 (24.7)
Secondary and above	622 (69.1)

Time to presentation was within an hour in 45.1%, 87% within 6 hours, and 12.8% after 6 hours. Higher acuity cases as defined by Australasian Triage score 1–2 constituted 12.5% of total case burden. Lower limb fractures (46.1%) were the most common injury [Table 2]. Two-wheeler bicycles and motorcycles formed 80% transport vehicles to be involved. Heavy vehicles such as trucks and buses were involved in 4%. Lower limb fractures were the major diagnosis (46.1%) [Table 2].

The evidence of alcohol consumption was seen in 144 patients. The percentage of males ($n = 624$) consuming alcohol was 73 compared to 26.4% females ($n = 276$) before accident ($P = 0.2$). Bad prognosis showed an association with triage score ($P = 0.001$), alcohol consumption ($P = 0.001$), and type of vehicle ($P = 0.001$) [Table 3].

DISCUSSION

RTA forms 4% of total emergency visits in our emergency. The majority of cases are young males. Similar pattern of gender and age distribution was shown by many authors in similar settings, Jha and Agrawal reported the prevalence as 33.2% with 77% male[7,8] and Getachew at 22% with 69% male.[9] Karkee in his systematic also reports young population as the most common age group. Young males are most mobile professionally and the productive age group that can explain the involvement of this age group.[10]

Most RTA occurred during winter to early spring. Similar patterns were noted by Getachew and Khaan.[9,11] In our country, this can be attributable to poor driving conditions, difficult geographical terrains along with foggy environment present during this weather. The distribution of weekdays shows denser cluster of accidents during Fridays and Sunday which are weekends for Nepal. Huang and Khaan also showed weekends as the most common time for accidents.[6] Ghosh in contrast reported Mondays as more common. This was explained by him as rush hour after weekends.[12]

The involvement of motorcyclists noted by us was similar to that in India, neighboring Asian country.[11,13] The heavy vehicles like trucks were noted to be lower in our study compared to others.[8,14] The possible cause could be restricted entries and low number of these vehicles. Fractures, especially of lower limbs, have been noted by earlier authors and similar to ours.[10,14]

Alcohol consumption, triage score, and two-wheeler involvement showed an association with mortality in our study. In the study by Patil *et al.*,[13] alcohol consumption was noted in almost one-third of the accident victims. "No drinking while driving" was an initiative by the Nepalese Government that was highly successful to bring down number of RTA as noted by Basnet.[15] Continuance of such regulations along with other preventive strategies safe transport, police, health, education regarding safe driving, and actions that address the safety of roads, vehicles, and road users may be helpful to decrease this modern epidemic of RTA.[16]

CONCLUSION

RTA is the most common in worldwide and leading problem in the developing countries like Nepal . Young and adult male who plays

Table 2: Injury diagnosis and triage score (*n*=900)

Characteristics	Frequency (%)
Type of injury	
Upper limbs fracture	266 (29.6))
Lower limbs fracture	415 (46.1)
Abrasion/laceration	116 (12.9)
Head injury	103 (11.4)
Types of vehicle involved	
Bicycles/rickshaw	271 (30.1)
Motorcycles	450 (50.0)
Light three/four wheelers	144 (16.0)
Heavy four wheelers	35 (3.9)
Triage score	
1	21 (2.3)
2	92 (10.2)
3	402 (44.7)
4	378 (42.0)
5	7 (0.8)

Table 3: Alcohol use among study population (*n*=900)

Gender	Alcohol (%)		Total (%)
	Used	Not used	
Male	106 (73.6)	518 (68.5)	624 (69.3)
Female	38 (26.4)	238 (31.5)	276 (30.7)
Total	144 (100)	756 (100)	900 (100)

Table 4: Treatment outcomes of RTA by related variables

Variables	Categories	Outcome		*P*
		Improved	Not improved /death	
Triage score	1	1	20	<0.001
	2	68	24	
	3	311	91	
	4	342	26	
	5	7	0	
Alcohol	Taken	97	47	<0.001
	Not taken	642	114	
Seasons	Winter	243	54	0.040
	Spring	248	74	
	Rainy	200	25	
	Autumn	48	8	
Type of vehicle	Bicycle/ rickshaw	256	15	<0.001
	Motorcycles	366	84	
	Light four wheelers	106	38	
	Heavy four wheelers	11	24	

RTA: Road traffic accident

an important role for the family are the majority who are involved in RTA. A total recorded RTA victims during 1-year period were about 900, which contribute 4.05% of total cases recorded in the emergency department during 1-year period, highest percentage of age category was 20–29 years group (34.1%), this shows that

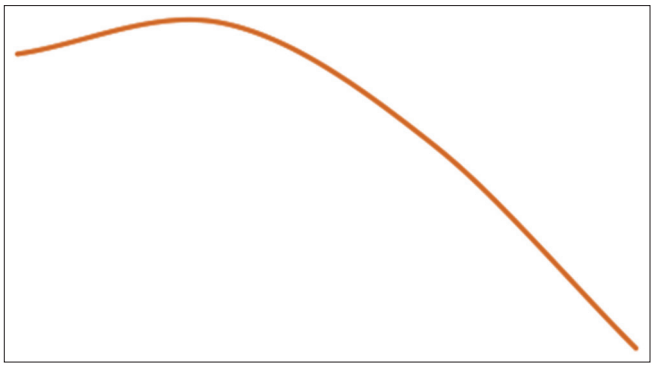

Figure 1: Season variation for road traffic accidents (*n* = 900)

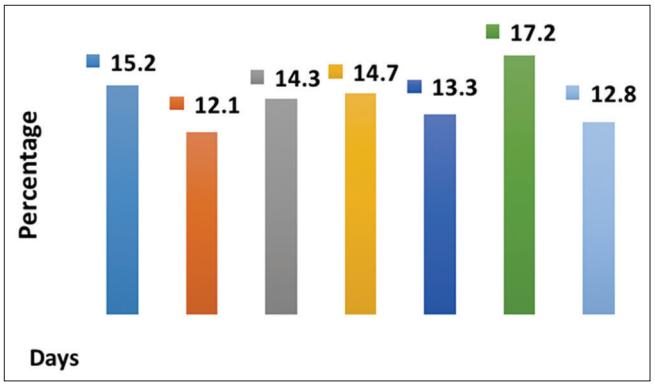

Figure 2: Day variation for road traffic accidents (*n* = 900)

the people of the most active and productive age groups are involved in RTAs. Majority have secondary level and above by literacy status. The accident rates were higher in male than female groups. Road accidents were more common in winter and spring. The road accidents were more seen on Sunday (15.2%) and Friday (17.2%). Evidence of alcohol was seen only in 16% in RTA, among them male was 106 (11.7%), and female was 38 (4.2%) [Table 4].

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