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Original Research Article

A Hospital-Based Assessment of the Pattern Resulting From Road Traffic Accidents: A Retrospective Study

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Abstract

Aim: Analysis of injury patterns resulting from road traffic accidents at a tertiary care teaching hospital.

Materials and Methods: The present study was conducted was conducted in department of FMT, Narayan Medical College and Hospital, Jamuhar, Sasaram, Bihar, India for one year. The study included all the patients admitted to the Advanced Trauma Centre. Unknown patient, Patient unwilling to give consent for study, Abscond and LAMA were excluded from the study. 410 participants were included in this study. Injury patterns included mode of injury, type of injury, type of road accidents and location of injury.

Results: In the majority of the patients, the type of injury seen was 35.9% (147) cases of head, neck and back injuries, followed by 24.4% cases with multiple injuries, 11.0% had hand/wrist injuries were seen, 9.3% cases of knee/lower legs, 8.6% cases have hip/thigh injuries, 6.4% cases had foot/ankle injuries, and 4.4% cases had shoulder/elbow injuries. It was seen that in maximum cases, the location of the accident site was road/street 63.2% (259), followed by workplace 20% (82), then home 13.9% (57), sports grounds 2% (8), school/colleges 0.5% (2) and others 0.5% (2). In the injury pattern, RTA was more in males, followed by fall from height. Similarly, in females, the most common is RTA, followed by falls from height. Furthermore, it was seen that motorbike/scooter collision with a vehicle; that is, two-wheeler is the most common cause of accident, followed by a fall from the vehicle but in the female gender, it was a fall from the vehicle was the most common cause, followed by motorbike/scooter collision with the vehicle. Also, the most common type of injury seen in both males and females was head, neck and back injury, followed by multiple injuries.

Conclusion: Trauma affects the nation's productive age group and is a major preventable cause of mortality and morbidity. However, if the right policies are implemented at the individual and governmental levels, a significant part of trauma can be avoided.

Keywords: Injury, Road traffic accidents,

Introduction

Road traffic accidents (RTAs) remain a significant global public health issue, contributing to a substantial number of injuries and fatalities each year. According to the World Health Organization (WHO), approximately 1.35 million people die annually as a result of RTAs, with tens of millions more suffering non-fatal injuries, often leading to long-term disabilities (WHO, 2018). The pattern of injuries resulting from RTAs varies widely depending on several factors including the type of vehicle involved, speed at the time of the collision, use of safety devices such as seat belts and helmets, and the location of impact. [1] Understanding the pattern of injuries from RTAs is crucial for developing effective prevention strategies, improving emergency medical response, and enhancing rehabilitation services. Injuries from RTAs can be categorized into several types, including head injuries, chest injuries, abdominal injuries, limb injuries, and spinal injuries. Among these, head injuries are often the most severe and can lead to significant morbidity and mortality. [2] Head injuries are common in RTAs, particularly among motorcyclists and pedestrians. These injuries range from minor concussions to severe traumatic brain injuries (TBIs), which can result in long-term

cognitive and physical impairments. Studies have shown that the use of helmets significantly reduces the risk of severe head injuries among motorcyclists. Despite this, helmet usage rates remain low in many low- and middle-income countries, exacerbating the burden of head injuries in these regions. [3] Chest injuries, including rib fractures, pulmonary contusions, and cardiac injuries, are also prevalent in RTAs. These injuries are particularly common in car occupants who experience frontal or side-impact collisions . The use of seat belts and airbags has been shown to reduce the severity of chest injuries; however, improper use or the absence of these safety devices continues to pose a significant risk . Abdominal injuries, though less frequent than head and chest injuries, can be life-threatening. These injuries often involve damage to internal organs such as the liver, spleen, and intestines. Blunt abdominal trauma is more common in car occupants, whereas penetrating injuries are often seen in motorcyclists and pedestrians . Rapid assessment and surgical intervention are crucial for managing severe abdominal injuries and improving patient outcomes. [4] Limb injuries, including fractures and dislocations, are among the most common injuries in RTAs. These injuries can range from minor fractures to complex, open fractures that require extensive surgical management . The use of safety devices, such as seat belts and protective gear for motorcyclists, can help mitigate the severity of limb injuries. Rehabilitation services play a vital role in helping patients recover and regain functionality following severe limb injuries. Spinal injuries, though less common, can have devastating consequences, including paralysis and long-term disability. These injuries often result from high-impact collisions and are associated with a high risk of mortality and morbidity. Early recognition and appropriate management of spinal injuries are essential to prevent secondary complications and improve the quality of life for affected individuals. [5-7]

Materials and Methods

The present study was conducted was conducted in department of FMT, Narayan Medical College and Hospital, Jamuhar ,Sasaram, Bihar, India for one year. The study included all the patients admitted to the Advanced Trauma Centre.

Methodology

Unknown patient, Patient unwilling to give consent for study, Abscond and LAMA were excluded from the study. 410 participants were included in this study. Injury patterns included mode of injury, type of injury, type of road accidents and location of injury. The participant (patient/attendant) information sheet was provided to all participants (patient/attendant), which include all the details of the study, and written informed consent was taken in local language from those who were willing to participate in the study. We have not performed any RCT.

The statistical analysis was carried out by using the software IBM SPSS 25.0.

Results

Out of a sample of 410 patients, maximum patients coming to ATC were from rural area 76% (313) and 24% (97) from urban area. Out of 313 patients from rural area 78.7% (269) were males and 64.7% (44) were females. There were 97 patients from urban area out of which 21.3% (73) were male and 35.3% (24) were female with Chi-square value of 6.111 and P- value is 0.01, which is significant. It was seen that the mode of injury in maximum cases of 60.2% (245) was the cause of the injuries was an RTA, 22.1%, (90) cases were fall from height, 12.3% (50) cases were occupational machine injury, 4.2% (17) cases came with assault, 0.5% (2) cases came with burns, and 0.7% (3) cases were due to various other reasons. It was seen that maximum patients, 44.4%, (115) had motorbike/scooter collisions with a vehicle, 28.2% (73) cases had a fall from the vehicle, 14.3% (37) cases had a collision with two/four wheeler, 5.8% (15) patients had four wheeler collision with a vehicle, 5.0% (13) patients had bicycle's collision with a vehicle, and 2.3% (6) had various other causes. In the majority of the patients, the type of injury seen was 35.9% (147) cases of head, neck and back injuries, followed by 24.4% cases with multiple injuries, 11.0% had hand/wrist injuries were seen, 9.3% cases of knee/lower legs, 8.6% cases have hip/thigh injuries, 6.4% cases had foot/ankle injuries, and 4.4% cases had shoulder/elbow injuries. It was seen that in maximum cases, the location of the accident site was road/street 63.2% (259), followed by workplace 20% (82), then home 13.9% (57), sports grounds 2% (8), school/colleges 0.5% (2) and others 0.5% (2). In the injury pattern, RTA was more in males, followed by fall from height. Similarly, in females, the most common is RTA, followed by falls from height. Furthermore, it was seen that motorbike/scooter collision with a vehicle; that is, two-wheeler is the most common cause of accident, followed by a fall from the vehicle but in the female gender, it was a fall from the vehicle was the most common cause, followed by motorbike/scooter collision with the vehicle. Also, the most common type of injury seen in both males and females was head, neck and back injury, followed by multiple injuries.

Table 1: Association of injury patterns with gender

Injury pattern association with gender	Gender (Total no. of patients)	
	Male	Female
Mode of Injury		
Road traffic accident	47	198
Burns	1	1
Assault	0	17
Fall from height	17	73
Occupational Machine injury	1	49
Others	1	2
Type of Road Accident		
Patient collision with two/four wheeler	11	26
Patient's bicycle's collision with a vehicle	2	11
Patient motorbike/scooter collision with a vehicle	17	98
Patient's four-wheeler collision with a vehicle	1	14
Fall from vehicle	20	53
Others	0	6
Type of Injury		
Head, Neck and Back	25	122
Shoulder and Elbow	5	13
Hand and wrist	2	43
Hip and Thigh	8	27
Knee and Lower leg	6	32
Foot and ankle	8	18
Multiple injuries	14	86

The road traffic accident was seen maximum in the age group 15-45 with the significant P- value is 0.001. The most common type of road accident seen in the age group 15-45 was the collision of a motorbike/scooter with a vehicle, with a Chi-square value of 27.698 and a P- value is 0.001, which is significant. The most common type of injury seen in the age group 15-45 was head, neck and back, followed by multiple injuries with a Chi-square value of 75.371, and the P- value is very significant at 0.001 [Table 2].

Table 2: Association of injury patterns with age

Association of injury patterns with age	**Age groups (Total no. of patients)**			
	0-15 years	**15-45 years**	**45-64 years**	**>64 years**
Mode of Injury				
Road traffic accident	8	170	52	15
Burns	1	0	1	0
Assault	1	13	3	0
Fall from height	12	48	21	9
Occupational Machine injury	1	29	16	4
Others	1	0	2	0
Type of Road Accident				
Patient collision with two/four wheeler	6	18	9	4
patient's bicycle's collision with the vehicle	1	9	1	2
Patient motorbike/scooter collision with the vehicle	1	86	23	5
Patient's four-wheeler collision with the vehicle	0	13	2	0
Fall from vehicle	4	46	19	4
Others	0	4	2	0
Type of Injury				
Head, Neck and Back	5	91	37	14
Shoulder and Elbow	4	9	5	0
Hand and wrist	1	27	13	4
Hip and Thigh	4	24	3	4
Knee and Lower leg	0	25	7	6
Foot and ankle	8	9	9	0
Multiple injuries	2	77	21	0

Discussion

Trauma services are one of the core areas of a hospital. Teaching hospitals have to bear the burden of treating many patients in our country, where trauma services are not so well developed. No concept of emergency medicine or trauma care is in use, even in urban areas. As a result, teaching hospitals' emergency departments receive many referrals for emergency conditions. The patient's injury pattern was studied, including mode of injury, type of road accident, site of injury and location of accident sites. In our study, it was seen that maximum patients coming to ATC were from rural area 76% (313) and 24% (97) from urban area. Similar results were found in a study conducted by M. Swarnkar et al., which indicated that rural residents were substantially more impacted than urban ones. [4] According to Ruikar et al. observation, urban regions saw 46.5% of accidents, whereas rural areas saw 53.5%.9 According to Rastogi et al. findings, there were nearly twice as many admissions for accidents in rural areas than in urban ones. [11] Because of the hostile environment, the poor educational system and lack of supportive structure, the severity of the problem is worse in rural areas. The great majority of rural doctors lack any type of speciality training. Long distances, difficult terrain, a lack of EMS services and communication and a lack of diagnostic tools are just a few of the challenges faced by rural physicians. We identified that RTA was the most common method of injury in 60.2% (245) of the cases, followed by falls from height in 22.1% (90). Our results are similar to studies by M Swarnkar et al., [4] Ranjana Singh et al., [13] Imran Ahmad, [6] and R. K. Rohilla et al. [7] They also came across RTA as the major mode of injury with 46.85%, 69.5%, 52% and 53.5% cases, respectively. RTAs pose a serious threat to the public's health in our society. Actions are also required to reduce the morbidity and mortality caused by these injuries. The national highways have the most traffic and the fastest-moving vehicles; the roads are narrower and have many crossings. There is a lack of law enforcement and unsafe driving practices while also displaying reckless and erratic driving conduct. Another frequent reason for injuries was falling (22.1%). Among the falls were those from a height at work, from a roof in a rural area, from stairs and a bed. This emphasizes the necessity of designing safer dwellings with adequate boundary walls and roofs and safe working environments for laborers and industrial workers. Rohilla et al. [7] a study produced similar findings. In their study, they discovered 30% of cases of falls from height. Our results agree with those of the study conducted by Mishra et al. [8] Type of road traffic accident In road traffic accidents, the maximum number of patients, 44.4% (115), had motorbike/scooter collisions with a vehicle, and 28.2% (73) cases had fall from vehicles. Studies by Imran Ahmad et al., [6] Ranjana Singh et al., [13] R.K. Rohilla et al., [7] Ruikar et al. [9] and Madhu et al. [10] have likewise demonstrated total concordance with our study. In the above studies, motorbike accidents accounted for 81%, 66%, 44%, 23.2% and 41.3% of all cases. Fall from height was the second-most common mode (22.78%). Due to their reduced cost and simpler handling, the number of two-wheeled vehicles on the road has significantly increased due to lower cost and affordability. This makes two-wheelers one of the leading causes of bike and two-wheeler-related injuries, and other body parts are not covered on them. Site of injury In the majority, 35.9% of the patient's injury site was head, neck and back. In 24.4% of cases, multiple injuries were seen. Similar results were seen in a study by Imran Ahmad; head injuries were the most common (52%) in victims of road traffic accidents, followed by lower-limb injuries (18%) and multiple injuries (16%).[6] M Swarnkar et al.,4 R.K.Rohilla et al.,7 Rastogi et al. [11] and Shiva Prakash et al.12 have also mentioned that head injury in 60%, 25.85%, 57.2% and 18.31% of cases is the commonest site of injury. However, the study was performed by Ranjana Singh et al. [13] showed injuries affecting extremities were 53.54%, and maxillofacial injuries were 19.31%. In most cases, the location of the accident site was road/street 63.2% (259), followed by workplace 20% (82). According to M Swarnkar et al., the majority of injuries (62.10%) occurred on roads, and the next highest percentage (24.98%) occurred at workplaces.[4] Roads were the most frequent site of injury, followed by homes (9.62%), farms (8.93%) and workplaces (7.92%), according to R.k. Rohilla et al.[7] Roadside injuries were reported to be the primary cause of admissions (66.71%), followed by residential injuries (23.66%), according to Rastogi et al. [11] The lack of any real divide between wheeled and pedestrian traffic, a general disregard for traffic regulations, and a poor crossroad and speed breaker design all contribute to the high incidence of trauma along the roadside. In our study it was seen that maximum patients coming to ATC were from rural area 76% (313) and 24% (97) from urban area. We identified that RTA was the most common method of injury in 60.2% (245) of the cases, followed by falls from height in 22.1% (90). In road traffic accidents, the maximum number of patients, 44.4% (115), had motorbike/scooter collisions with a vehicle, and 28.2% (73) cases had fall from vehicles. In the majority, 35.9% of the patient's injury site was head, neck and back and in 24.4% of cases, multiple injuries were seen.

In most cases, the location of the accident site was road/street 63.2% (259), followed by workplace 20% (82).

Trauma affects the nation's productive age group and is a major preventable cause of mortality and

morbidity. However, if the right policies are implemented at the individual and governmental levels, a significant part of trauma can be avoided.

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