International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR |Volume 3 | Issue 2 | April-June- 2015
www.ijamscr.com

Research article ***Hospital research***

Road traffic accidents and their relationship with severity of head injury according to type of road user: An epidemiological survey in a tertiary care hospital in Kollam, Kerala

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ABSTRACT

BACKGROUND: Road traffic accidents are now becoming a leading cause of death among younger population. Every year nearly 1 million people die due to these accidents. Pedestrians are most vulnerable for injury in accidents. Head injury is an important cause for these deaths.

OBJECTIVE: To find out the distribution and severity of road traffic accidents and to find the association between type of road user and head injury received during accident.

MATERIAL AND METHODS: A cross sectional study conducted in a tertiary care hospital of Kollam, Kerala. 400 patients admitted during October 2014 to march 2015 in the casualty for road accidents were selected for analysis. Emergency case files of these patients were studied in detail. Epi Info version 3.5.1. was used for analysis. Chi-square test was done to find significance. Difference was accepted as significant at more than 95% (p-value <0.05).

RESULTS: The mean age of patients was 39 years. Maximum (25%) patients were of the age group 21-30 years. 75% were males and 48.2% suffered head injuries. 24.75% were pedestrians. Out of these 57.6% suffered head injury. 5.8% of patients suffered severe head injury. Pedestrians suffered more (10.1%) severe head injury than non-pedestrians (4.3%). 6.5% succumbed to their injuries. Death rate among patients who suffered head injury (10.4%) was significantly more as compared to those who did not have head injury (2.9%).

CONCLUSION: Road traffic accidents are a major public health problem although it can be prevented. Pedestrians should be very careful. The patients who receive head injury are at greater risk for mortality.

Key words: Road traffic accidents, Kollam, Pedestrians, Head injury

INTRODUCTION

Road traffic accidents (RTAs) are predicted to become fifth leading cause of death by 2030 from ninth in 2004 worldwide. These are one of the main causes of death among younger population aged 15-29 years[1]. Every year 1.2 million people are killed in RTA. Low and middle income countries are worst hit accounting for about 85% of these deaths[2]. During 2012, 0.4 million RTAs occurred in India. In Kerala, 36,174 cases of RTA occurred in

which 4286 people died. Although death rate due to RTA in Kerala is less (11.8%) as compared to national average (31.6%) [3]. Head injury has been defined as a physical damage to the scalp, skull or brain produced by an external force[4]. In United States, Road accidents are second leading cause of head injury (17.3%) and result in the largest percentages (31.8%) of head injury related deaths[5]. In India, pedestrians contribute to nearly 30-40% percent of all RTA. Pedestrian injuries form a major percentage of workload in emergency department[6]. There are not many studies done to see RTAs and its effect on pedestrian head trauma. Keeping this fact in mind, we did a study to find out the distribution and severity of RTAs and to find the association between type of road user and head injury received during accident.

MATERIAL AND METHODS

A hospital based cross sectional study was conducted in casualty of Travancore Medical College hospital, Medicity, Kollam. During October 2014 to march 2015, the casualty in the hospital attended nearly 455 RTAs. Emergency case files of these patients were studied in detail. A proforma was made and information like age, sex, type of patient, head injury received and Glasgow's Coma Scale (GCS) was noted. Study unit was individual patients and study subjects were all the RTA patients irrespective of age group admitted to our casualty in that period. It was retrospective study although we collected the missing data by having a telephonic conversation with the victim himself or their relatives. Severity of injury was classified according to GCS: Mild (13-15), Moderate (9-12) and severe (3-8). We analyzed all the files but the analysis was complete only for 400 patients. In case of others, the data was incomplete and they did not respond to our calls either. Epi Info version 3.5.1. was used for analysis. Chi-square test was done to find significance. Difference was accepted as significant at more than 95% (p-value <0.05).

OPERATIONAL DEFINITIONS

RTA

A road vehicle collides with another vehicle or pedestrian and result in injuring or killing at least one person.[7]

TYPE OF ROAD USER

What was the status of the injured patient at the time of RTA? e.g. pedestrian, Non-pedestrian (motorized two wheeler or four wheeler).

RESULTS

In the present study, we selected 400 RTA patients admitted in our casualty in last 6 months for analysis. The mean age of patients was 39 years (Standard Deviation of 17 years) with mean for males being 38 years and for females being 44 years. The age of youngest patient was 6 months and oldest was 83 years. Figure 1 shows age distribution of patients. Maximum (25%) patients were of the age group 21-30 years while minimum (2%) were in the age group 0-10 years. Almost 57% of the patients were of the age group 21-50 years. Geriatric patients were nearly12%. Figure 2 shows sex distribution of patients. 75% were males while 25% were females.

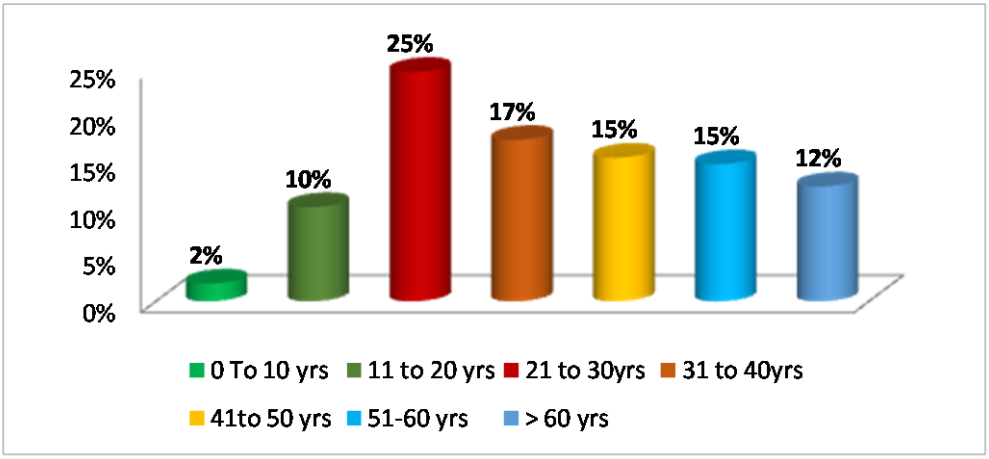

Figure 1: Age group distribution among RTA patients

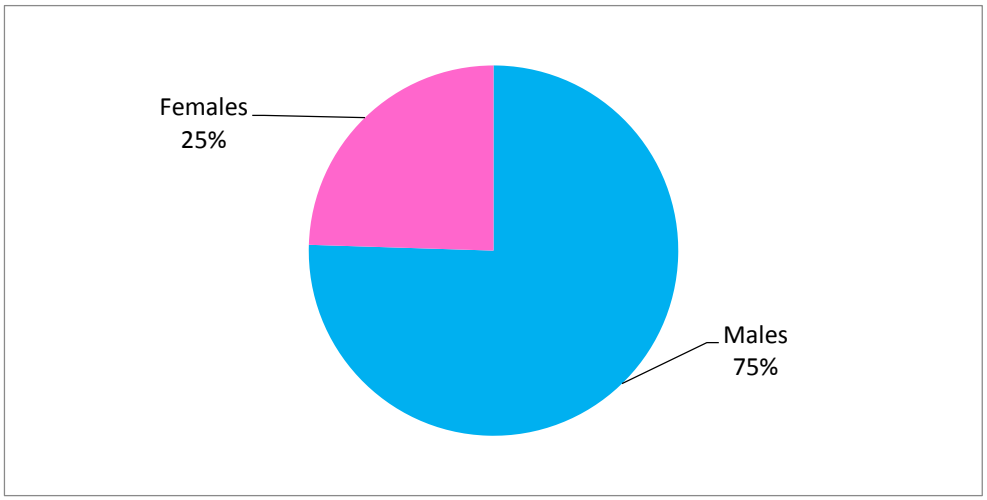

Figure 2: Sex distribution among RTA patients

Table 1 shows that out of 400 RTA patients, 193 suffered head injuries. So, the prevalence of head injury was 48.2% (as all of the victims were susceptible or at risk for head injury). 99 patients were pedestrians giving percentage of pedestrians among RTA patients to be 24.75%. Out of these 57.6% suffered head injury. Among those who were not pedestrians i.e. travelling in two wheelers or four wheelers or in bus, 45.2% suffered head injury. All these differences are significant (p<0.05). So, pedestrians suffered more head injuries as compared to non-pedestrians and the risk was nearly one and half times more (OR=1.64, 95% C.I. 1.04-2.60) among pedestrians.

Table 1: Association between Head injury and type of road user

Type	**Head Injury**					**Statistics**
Pedestrian	Yes	No	Total	**OR**	**95% of CI**	
Yes	57 (57.6)	42 (42.4)	99	1.64	1.04-2.60	χ^2 =4.58 , DF = 1,
No	136 (45.2)	165 (54.8)	301	-	-	p = 0.032;
Total	193 (48.2)	207 (51.8)	400	-	-	significant
Figures in parenthesis are in percentages						

Table 2 analyses the severity of head injury according to GCS and type of road user. We found that the percentage of patients who suffered from Mild (13-15), Moderate (9-12) and severe (3-8) head injuries were 82%, 12.2% and 5.8%. In pedestrians, 10.1% patients suffered severe head injury while in non-pedestrians only 4.3% had severe head injury. More (86.4%) non-pedestrians had mild head injury as compared to pedestrians (68.7%). All these differences are highly significant (p<0.0001).

Table 2: Severity of head injury according to GCS and type of road user

Type	**Severity of head injury**				**Statistics**
Pedestrian	Mild	Moderate	Severe	Total	χ^2 =15.80 ,
Yes	68(68.7)	21(21.2)	10(10.1)	99	DF = 2,
No	260(86.4)	28(9.3)	13(4.3)	301	p < 0.0001;
Total	328(82)	49(12.2)	23(5.8)	400	Highly significant
Figures in parenthesis are in percentages					

Table 3 finds association between head injury and mortality. Out of 400 patients, 26 (6.5%) died of injuries inflicted in accident and during stay in the hospital. This cannot be the real death percentage as some would have died after discharge from hospital. We found out that the death rate among patients who suffered head injury (10.4%) was more as compared to those who did not have head injury (2.9%) and the difference was significant ($p<0.05$). The overall risk of mortality among patients who had head injuries was nearly four times more as compared to those who did not suffer head injuries.

Table 3: Association between Mortality and head injury

Head Injury	**Mortality**					**Statistics**
	Yes	No	Total	**OR**	**95% of CI**	
Yes	20(10.4)	173(89.6)	193	3.87	1.52-9.86	χ^2 =9.15 , DF = 1,
No	6(2.9)	201(97.1)	207	-	-	p = 0.002;
Total	26(6.5)	374(93.5)	400	-	-	Significant
Figures in parenthesis are in percentages						

DISCUSSION

Among RTA patients of our study, most common age group affected was 21-30 years. WHO states that RTAs are the leading causes of morbidity and mortality among population of 15-29 years age group in both sexes in the world.[1] The same findings were seen in studies done in India.[3, 8] This is the age group which goes out mostly for studies or works and has a tendency to be a little impetuous. Geriatric patients were nearly12% among RTA victims. Studies have shown the vulnerability of elderly population in RTAs. They are more prone to trauma as they have less balance, fall easily, and hit by vehicles.[9, 10] Three fourth of the RTA patients were males. A retrospective study done in Hapur (Uttar Pradesh) showed that 74% of the victims of RTA were males.[11] National Crime Records Bureau of India and various other studies also proves that males are most affected in RTAs.[3, 12, 13] Nearly half of the RTA patients suffered head injury. Other studies also prove this fact.[14-16] 25% of the RTA patients were pedestrians. Walking by road is a very common mode of transport in low and middle income countries and pedestrian accidents have been increasing in these countries.[9] Studies done in various parts of India have shown that 13-26% of the RTA victims are pedestrians.[17-19] Among pedestrians, 57.6% suffered head injury. Pedestrians suffered more severe head injuries as compared to non-pedestrians. Malhotra et al observed in their study that severity of injuries was greater in pedestrians.[20] 5.8% of the RTA patients suffered severe head injury with 3-8 score of GCS. Urfi et al found that 8% of the RTA victims had severe head injury with GCS of 3-8.[21] GCS is an important predictor of outcome. If it is high (13-15), we can expect a good outcome and if it is low (3-8), adverse outcome is inevetible.[22] Patients who suffered head injury died more (10.4%) as compared to those who did not suffer head injuries (2.9%). Head injury as the most common cause for mortality among RTA cases was seen by Farooqui et al.[23] Mortality survey of over 122000 deaths at all ages from 2001 to 2003 in India showed that RTA causes a substantial number of deaths especially among pedestrians.[24] Gururaj elaborated some principles to be followed if we want to decrease RTA and its related morbidity in India. A clear policy on road safety, a coordinating cell, proper allocation of budget, strict interventions and a reliable information system is the need of the hour. Health professionals can contribute and should become a role model.[25]

CONCLUSION

RTAs are slowly becoming a major public health problem. The majority of patients in our study were young in their productive years and male preponderance was seen. Pedestrians are at risk while commuting. The severity of head injury is an important predictor for prognosis. The mortality is directly related to head injury.

RECOMMENDATIONS

We all must follow the traffic rules. There should be no haste while driving because by doing so we are putting others life in danger apart from ours. Pedestrians must take precautions. Immediate transfer of the victim to a nearby hospital is also necessary.

LIMITATIONS

It has the common drawbacks of retrospective studies depending solely on case records but we tried to minimize it by telephone calling to the victims and filling missing data. Anyway there can always be recall bias and we relied on patients for the truth. The death rate is not final as some would have died after the discharge from the hospital.

ACKNOWLEDGEMENT

We sincerely acknowledge Mr. John of record section in our hospital for helping us in data collection. I am grateful to the Medical Superintendent who gave us permission for the study.

SOURCE OF SUPPORT

Nil

CONFLICT OF INTEREST

None declared

REFERENCE

1. World Health Organization, Regional office for South-east Asia. Injuries and violence. The facts 2010. Geneva. Switzerland WHO; 2010,p 3,10. Available from http://whqlibdoc.who.int/ publications /2010/9789241599375_eng.pdf [Last accessed on 2015 May 19].
2. Peden M. Global collaboration on road traffic injury prevention. Int J Inj Contr Saf Promot 2005;12:85-91.
3. National Crime Records Bureau. Accidental Deaths & Suicides in India; 2012. Available from http://ncrb.gov.in/CD-ADSI-2012/ADSI2012.pdf [Last accessed on 2015 May 19].
4. Vij K. Text Book of Forensic Medicine and Toxicology. 2nd ed. India Churchill Livingstone, 2002,p521.
5. Faul M, Xu L, Wald MM, et al. Traumatic brain injury in the United States Emergency department visits , Hospitalizations and deaths 2002-2006. Atlanta (GA) Centres for Disease Control and Prevention, National Centre for Injury Prevention and Control; 2010 21. Available from http://www.cdc.gov/ traumatic brain injury/pdf/blue_book.pdf [Last accessed on 2015 May 19].
6. Pruthi N, Ashok M, Kumar VS, Jhavar K, Sampath S, Devi BI. Magnitude of pedestrian head injuries & fatalities in Bangalore, south India a retrospective study from an apex neurotrauma center. Indian J Med Res 2012;136:1039-43.
7. World Health Organization, Regional office for South-east Asia. World Report on road traffic injury prevention 2004. Geneva, Switzerland WHO; 2004, p33-46. Available from http://www.who.int /violence_injury_prevention/publications/road_traffic/world_report/summary_en_rev.pdf [Last accessed on 2015 May 19].
8. Pathak SM, Jindal AK, Verma AK, Mahen A. An epidemiological study of road traffic accident cases admitted in a tertiary care hospital. Med J Armed Forces India 2014;70:32-5.
9. Yeung JH, Chang AL, Ho W, So FL, Graham CA, Cheng B, et al. High risk trauma in older adults in Hong Kong a multicentric study. Injury 2008;39:1034-41.
10. Takanishi DM Jr, Yu M, Morita SY. Increased fatalities and cost of traumatic injuries in elderly pedestrians in Hawaii a challenge for prevention and outreach. Asia Pac J Public Health 2008;20:327-39.
11. Singh R, Singh HK, Gupta SC, Kumar Y. Pattern, Severity and Circumstances of Injuries Sustained in Road Traffic Accidents. A Tertiary Care Hospital-Based Study. Indian J Community Med 2014;39:30-4.
12. Subedi N, Yadav BN, Jha S, Paudel IS, Regmi R. A profile of abdominal and pelvic injuries in medico-legal autopsy. J Forensic Leg Med 2013;20:792-6.
13. Kumar A, Lalwani S, Agrawal D, Rautji R, Dogra T. Fatal road traffic accidents and their relationship with head injuries an epidemiological survey of five years. Indian Journal of Neurotrauma 2008;5:63-67.
14. Kraus JF, Fife D. Incidence, external causes, and outcomes of work-related brain injuries in males. J Occup Med 1985;27:757-60.
15. Singh H, Dhattarwal SK. Pattern and distribution of injuries in fatal road traffic accidents in rohtak (Haryana). JIAFM 2004;26:20-23.
16. Aggarwal KK, Oberoi SS, Kumar R, Sharma M. Pattern and distribution of injuries in fatal road traffic accident cases. J Punjab Acad of Forensic Med & Toxicology 2009;9:72-75.
17. Patil SS, Kakade R, Durgawale P, Kakade S. Pattern of road traffic injuries a study from western Maharashtra. Indian J Community Med 2008;33:56-7.

18. Suryanarayana S, Gautham M, Manjunath M, Narendranath V. Surveillance of injuries in a tertiary care hospital. Indian J Community Med 2010;35:191-2.
19. Fitzharris M, Dandona R, Kumar GA, Dandona L. Crash characteristics and pattern of injury among hospitalized motorized two-wheeled vehicle users in urban India. BMC Public Health 2009;9:11.
20. Malhotra C, Singh MM, Garg S, Malhotra R, Dhaon BK, Mehra M. Pattern And Severity Of Injuries In Victims Of Road Traffic Crashes Attending A Tertiary Care Hospital Of Delhi. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology [serial online] 2005;6. Available from http://www.anilaggrawal.com/ij/vol_006_no_002/papers/paper006.html [Last accessed on 2015 May 21].
21. Urfi, Kirmani S, Amir A, Hoda MF, Khalil S. Road traffic accidents with head injury a study from western Uttar Pradesh. National Journal of Community Medicine 2013;4:252-5.
22. Odebode TO. Age related pattern and outcome of head injury in indigenous Africa. Niger J Clin Pract 2008;11:265-9.
23. Farooqui JM, Chavan KD, Bangal RS, Syed MM, Thacker PJ, Alam S, et al. Pattern of injury in fatal road traffic accidents in a rural area of western Maharashtra, India. Australas Med J 2013;6:476-82.
24. Hsiao M, Malhotra A, Thakur JS, Sheth JK, Nathens AB, Dhingra N, et al. Road traffic injury mortality and its mechanisms in India nationally representative mortality survey of 1.1 million homes. BMJ Open 2013;3:e002621.
25. Gururaj G. Road traffic deaths, injuries and disabilities in India current scenario. Natl Med J India 2008;21:14-20.