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Original Research Article

A Study on Pattern of Head Injuries in Two Wheeler Road Traffic Accidents

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ABSTRACT

Road traffic injuries are the ninth leading cause of deaths globally, and are estimated to rank sixth by the year 2020. The outcome of injuries sustained in an RTA depends on various factors including but not limited to: the location of the event, type of vehicle involved, nature of the roads, the time of accident. In The PIMS Total 100 cases of head injury deaths were brought to mortuary directly from the spot or from accidental emergency or from neurosurgery department for the autopsy examination and out of these 70 cases of RTAs (70.83%) were selected for the present study. The incidences of subdural hemorrhage (SDH) was maximum in 68.13% cases followed by subarachnoid hemorrhage (SAH) in 68.13% cases, intracerebral hemorrhage in 12.89% cases and extradural hemorrhage (EDH) in only 12.89% cases. As this study shows head injuries were common among motorized two wheelers (22.6%) and none used helmet. The use of properly designed helmet should be made compulsory especially among the riders of motorized two wheelers. This might be effective in reducing head injuries. Prompt and adequate ambulance service should be provided to the victims with the help of government and other voluntary agencies. Computerization and use of International Classification of Diseases code in the hospitals would help in preparation of a good database for future studies and other uses.

Key words: Head Injuries, Two Wheeler, Road Traffic and Accidents.

INTRODUCTION

The total world growth of the transport system has been and continues to its key element in economic development. Increase in to the gross national product is accompanied by into a greater movement of people and goods and greater investment in both vehicles and transport infrastructure. [1] Developing in to the world, current trends of population growth, industrialization and urbanization were putting heavy pressure on the transport network in the general and on road system in particular. [2] A few of unwanted side-effects into this growth in traffic, such as like congestion and noise are immediately obvious to the individual citizen. As highlighted by the 2004 World Report on Road. [3]

Road traffic injuries are the ninth leading cause of deaths globally, and are estimated to rank sixth by the year 2020. However, if the burden of disease (represented by Disability Adjusted Life Years or DALYs) is taken into account, road traffic injuries are estimated to rank as the third leading cause of death by 2020. [4] The burden of road traffic injuries has been rising rapidly in South-East Asia (SEA) as countries are getting increasingly motorized. An estimate shows that SEA is the Region that will experience a sharp rise (more than 144%) in road traffic deaths by the year 2020 if the current trend continues. On the other hand, high-income countries will register a decline of 27% by 2020 in India; the motor vehicle population is growing at a

faster rate than the economic and population growth. [5]

The surge in motorization coupled with expansion of the road network has brought with it the challenge of addressing adverse factors such as the increase in road accidents. [6] According to the World Health Organization (WHO), road traffic injuries are the sixth leading cause of death in India with a greater share of hospitalization, deaths, disabilities and socio-economic losses in the young and middle-aged population. Road traffic injuries also place a huge burden on the health sector in terms of pre-hospital and acute care and rehabilitation. [7]

Road Accidents in India is an annual publication of the Transport Research Wing of the Ministry of Road Transport and Highways, Government of India. The Transport Research Wing is the nodal agency for providing information data on various facets of roads and road transport. [8] This report presents information on various aspects of road accidents in the country during the calendar year. The information is collected from the Police Departments of the respective States/Union Territories (UTs) in the 19-item format devised under the Asia Pacific Road Accident Data (APRAD)/Indian Road Accident Data (IRAD) project of the United Nations' Economic and Social Commission for Asia and the Pacific (UN-ESCAP). [9]

Road traffic accidents (RTA) are a major cause of concern all over the world. The outcome of injuries sustained in an RTA depends on various factors including but not limited to: the location of the event, type of vehicle involved, nature of the roads, the time of accident. According to the World Health Report 2002, of the global burden of injury, 30.3% morbidity and 28.7% mortality occurred in the South-East Asia Region. [10]

Others, such as the growing number of this deaths and injuries from road traffic accidents (RTAs), were apparent only through aggregated statistics. These reveal a serious and growing problem, with absolute fatality and casualty figures rising rapidly into majority of developing countries and with death rates considerably higher than in the developed world. [1]

Each year RTAs claim some 6,00,000 lives and thirty times this number, that is over fifteen million, are injured according To the World Health Organization. This represents more than one life lost every minute and an injury every two seconds. Two third of these victims are from the third world countries. [11]

As highlighted by the 2004 World Report on Road Traffic Injury Prevention (Peden et al., 2004) issued jointly by the World Bank and the World Health Organization, controlling the problem would require a concerted effort by national transport and health agencies. Unfortunately, at present, the need to reduce road traffic injuries is not high on the policy agenda of most developing countries. [12] This may be partly due to the underestimation of road traffic injuries in official government statistics relative to other health problems.

MATERIALS AND METHODOLOGY

This study was conducted at Forensic medicine, PIMS (Pondicherry Institute of Medical Sciences). The study group consisted of all the road traffic accident victims reporting to PIMS casualty in the above.

For the purpose of the study, an RTA was defined as an accident which took place on the road between two or more objects, one of which must be any kind of 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. persons getting injured while washing or loading a vehicle) or deaths due to RTA were excluded from the study. The victims of the accidents were interviewed to obtain the information about the circumstances leading to the accident.

In The PIMS Total 100 cases of head injury deaths were brought to mortuary

directly from the spot or from accidental emergency or from neurosurgery department for the autopsy examination and out of these 70 cases of RTAs (70.83%) were selected for the present study. The epidemiological data were obtained with all pathological features of these cases as scalp injury, pattern of skull fractures and intracranial hemorrhages and their distribution were noted at the actual autopsy examination of victim with detailed history related to time, manner and hospitalization. The medicolegal records and case-sheets of the victims were referred for collecting additional information and where necessary for cross checking.

Statistical analysis: Using SPSS software version 10 statistical analyses was done. The efficacy and safety variables using Student 't' test.

RESULTS

Total 100 cases of fatal head injury were registered during the period of study and out of these cases (65.84 %) were of RTAs, cases (19.13%) were of fall from height and rest 13 (13.91%) were of assault and other traumas. Males were more prone to death by RTAs (69.75%) as compare to females (30.25%), making an M: F ratio 4:1. Incidence of RTA was more in third (25.06%) and fourth decade (19.12%) as compared to both extremes of life.

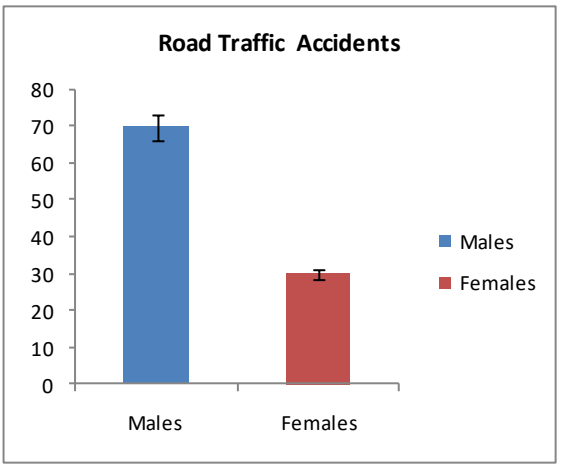

Figure 1 Gender comparison Road Traffic Accidents

The peak timings of RTAs were either morning hours of 8-12 or evening hours between 6-8. Incidence of deaths due to RTAs was maximum (47.66%) in two wheeler riders followed by pedestrians in 34.11% cases. Four wheelers were involved in 16.19% cases and bicyclists in only 3.53% cases. In two wheeler accidents most of the victims (85.17%) were not wearing any protective helmets at the time of incidence while in only 14.83% cases the victims died due to fatal head trauma even they were wearing protective helmets.

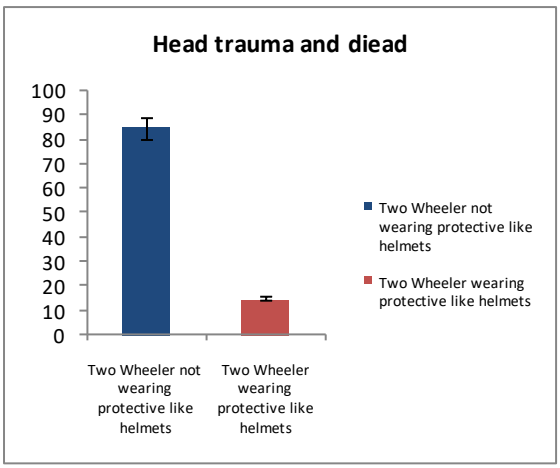

Figure 2 Two wheeler accidents most of the victims

The dominant type of skull fracture found was the linear (fissured) fracture in 43.04% cases followed by basilar fracture in 17.73%, comminuted fracture in 7.61%, crushes fracture in 5.06% and depressed fracture in 3.78% cases. In rest 22.78% cases, no skull fracture was found.

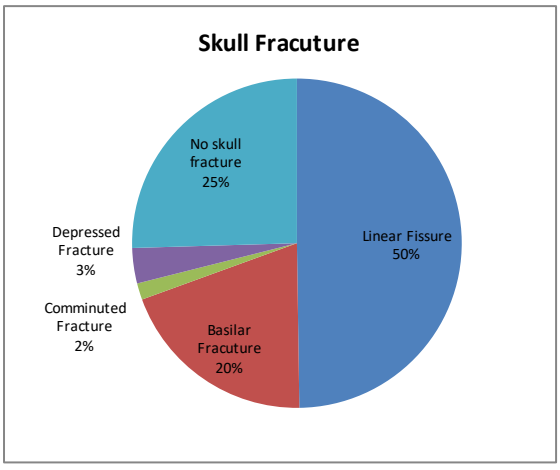

Figure 3 Dominant type of skull fracture

The incidences of subdural hemorrhage (SDH) was maximum in 68.13% cases followed by subarachnoid hemorrhage (SAH) in 68.13% cases, intracerebral hemorrhage in 12.89% cases and extradural hemorrhage (EDH) in only 12.89% cases.

Table 1 Distribution according to type of Intra cranial

S.NO.	**Type of Intracranial Haemorrhage**	**Number of cases (%)**
1	Extra dural Haemorrhage	9.24
2	Sub dural Haemorrhage	68.13
3	Sub arachnoid Haemorrhage	58.36
4	Intra cerebral Haemorrhage	12.89

DISCUSSION

RTI is an important cause of death in India, causing 183 600 deaths in 2005, or about 2% of all deaths. Head injury was the highest among the internal injuries noted in this study, a feature also reported by other studies4. Other common sites were the lower limbs and face. Similar observation was made by others.

This article outlines a detailed methodology for building a national snapshot of the incidence of deaths and injuries from road traffic crashes from sources other than police reports, which are usually the source for official government statistics. Such estimates are important to derive because of the large body of evidence that police reports underestimate road traffic injuries. For non-fatal injuries, police underreporting is substantial even in high-income countries (Amoros, Martin, & Laumon, 2007) [13] and police-based injury counts are rarely trusted. However, for deaths, it is often assumed that police reporting is complete because in many countries injury deaths are required by law to be investigated by forensic pathologists. While the existence of such a legal framework could improve police recording, the extent to which this happens and the socio-political conditions that lead to high levels of investigation, recording and reporting of njury deaths by the police have never been systematically studied. The methodology we propose of building estimates from alternate sources is one way of critically evaluating the completeness of police based injury statistics. There are also other methods for evaluating the completeness of police data. Among these, the most common method is to link records with another independent data source (e.g. hospital, news media reports) and identify the fraction of cases that are missed by both sources (Razzak & Luby, 1998; [14] Tercero & Andersson, 2004). [15] Unfortunately, correct application of the method, which in epidemiology is called ‘capture–recapture’ or ‘mark and recapture’, hinges on a set of assumptions that are violated in typical applications to road traffic injuries (Jarvis, Lowe, Avery, Levene, & Cormack, 2000). [16] In the context of developing countries, the most egregious violation is that the data sources used are typically inter-dependent. Victims that are listed in one administrative record (e.g. hospital or death register) have a much higher likelihood of being listed in another administrative record such as a police report. In the worst case scenario, if a hospital has a particularly strong tradition of cross-documenting injury admissions with the police, comparing hospital records with police records will misleadingly suggest high police coverage. Similarly, news reports are unlikely to be an independent data source especially when news agencies rely on police reports for the news stories. Application of capture–recapture using such closely inter-dependent sources produces results that suggest high coverage of police reporting even when this may not be true and risks providing false legitimacy to such record keeping. Instead, our approach relies on building estimates independently from the police reports using the country-specific patchwork of alternate data sources. Any site with which a road traffic crash victim may come in contact (such as an ambulance system, emergency rooms, hospital wards, civil registration systems, funeral grounds) qualifies as a potential data source. However, appropriate use of these datasets requires careful analytical handling of a range of issues 246 K. Bhalla et al. [17]

Downloaded By that include estimation of underlying populations for adjustment for completeness and coverage; mapping between various definitions of recorded injury cases; dealing with poor quality data – such as cases coded to poorly specified causes; and extrapolating to regions with missing information. Such analytical manipulations of data can introduce substantial uncertainty in the derived estimates. These uncertainties should be quantified to make cross-country comparisons or the comparisons of multiple sources within the same country, meaningful. Since most of these issues are subjects of ongoing research and development in the field of health metrics (Alexandrescu, O'Brien, Lyons, & Lecky, 2008; [18] Bhalla et al., 2008; [19] Shahraz et al., 2008), [20] this article provides current best practice recommendations as they apply to estimating road traffic injuries.

The application of this method results in a single snapshot of the incidence of road traffic injuries that can be used to test the validity of official government statistics and provide estimates that can be used for setting national road safety policy priorities. It is important to note that this is fundamentally different from injury 'surveillance', which refers to ongoing data collection (Holder, 2004) [21] and is intended for tracking the growth/decay of a problem. While timeliness of reporting is important for surveillance, it matters less for our goals allowing us to use data sources such as surveys and death certificates which may not be considered timely for injury surveillance. On the other hand, in the few developing country settings where injury surveillance infrastructure has been established, the surveillance systems are typically incapable of directly reporting national estimates of the incidence of injuries. Most injury and trauma surveillance systems are established at selected hospital sites and are not intended to be able to generate population rates. Often based in urban settings, they can provide a biased view of the characteristics of the national road traffic injury problem. Thus, to be useful in setting national policies, data from such surveillance systems need to be subject to the same analytical adjustments along with other data sources as has been described in this article. Although the approach we recommend here is intended to produce evidence to challenge official statistics, national governments could also incorporate this methodology as part of their long-term road traffic injury data strategy. In such a framework, countries would rely on the timeliness of the data provided by the injury surveillance systems to track the evolution of the road safety problem, while periodically performing evaluations from all other data sources to test the accuracy of their official statistics and to push for improvements.

Distribution and causes of intracranial injuries in present study are more or less similar to the pattern found in most of the other studies. This similarity is there in almost all parameters used in this study. These accidents occur more frequently in certain age groups, at certain times of day and at certain localities. Some people are more prone to accidents than others and the alcohol, un-awareness of traffic discipline and carelessness increase the susceptibility. The rate of incidence is higher in India because of its traffic patterns and possibly the lack of preventive measures such as helmets in motor cyclists and seatbelts in automobiles and poorly controlled traffic conditions and poor road conditions.

CONCLUSIONS

The RTA was defined as an accident which took place on the road between two or more objects, one of which must be any kind of 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. persons getting injured while washing or loading a vehicle) or deaths due to RTA were excluded from the study.

As this study shows head injuries were common among motorized two wheelers (22.6%) and none used helmet. The use of properly designed helmet should be made compulsory especially among the riders of motorized two wheelers. This might be effective in reducing head injuries. Prompt and adequate ambulance service should be provided to the victims with the help of government and other voluntary agencies. Computerization and use of International Classification of Diseases code in the hospitals would help in preparation of a good database for future studies and other uses.

The victims of the accidents were interviewed to obtain the information about the circumstances leading to the accident. We observed and concluded that all cases of (EDH) extradural hemorrhage were found in association with SDH while 75% cases of (SAH) subarachnoid hemorrhage were found in association with (SDH) subdural hemorrhage. In 63.29% cases the head injury was so severe that the victims could not survive even for 12 hours after the incidence and most of them died either on the spot, on the way or immediately after they get admitted in the casualty ward. Only 6.33% could survive up to 24-48 hours, 18.98% up to 3- 7 days and 11.4% could survive more than 7 days following the intervention of particular treatment or appropriate surgery.

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Conflict Of Interest:

None declared.

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