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## Pre-hospital care: Data profile from traumatic brain injury registry

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**Abstract:** *Introduction:* There are multiple factors from injury spot till patient reach trauma unit, which affect their outcome. The literature of same from developing country is mere. The present study investigates primary care, mode of transportation and emergency management among TBI patients visiting a tertiary institute. *Methods:* The data of 337 patients was selected from a trauma registry. The data of TBI patients visiting emergency were entered in standard computer interface after obtaining their consent. The standard proforma was developed by FileMaker Pro Advanced 13 (Copyright © 1994-2015, FileMaker, Inc) and web data entry interface Drupal CMS. Data was analyzed using Stats Direct version 3.0.150. *Results:* Seventy five percent of patients were from rural setup. About 67% of patients visiting emergency had undergone first aid from both rural and urban setup. Forty percent of patients came directly, only about 5% were referred from other hospitals. Majority of patients were accompanied by relatives (87%) followed by spouse (8.6%). Non ambulance mode (31%) was more than ground ambulance (25%) to reach emergency setup. Emergency management of airway, breathing and circulation was significant with outcome at discharge ( $p < 0.001$ ). *Conclusion:* The study reports that majority of patients had undergone first aid before reaching trauma unit. Non ambulance mode of transportation is more. The study emphasis for detail study on pre hospital care variables with larger sample size.

**Key words:** first aid, bystander, transportation, ambulance, airway, breathing, circulation

### Introduction

Traumatic brain injury (TBI) is a lead cause of neurological disability in India. (1) In our country most of injury control strategies focus

on primary prevention that is adopting safety measures and following appropriate road rules. Only few metropolitan cities have adopted these guidelines, but not completely.

(2) The secondary prevention is by providing adequate medical response to manage and thereby minimise harm following an injury. (2) For injury per se immediate handling in emergency and in time transportation to health care is very crucial for early management care that prevents long term consequences. (3) Unfortunately, the well trained staff capacity to provide this basic level of medical care does not exist in all the parts of our country. (3) The current study estimates the primary aid, transportation and early life support that TBI victims are engrossing in current medical setup.

## Methods

The current study data is selectively selected from a trauma registry data that is in first phase. The data collection was carried out at Narayana Medical College and Hospital, Nellore, Andhra Pradesh (India). The center has exclusive emergency trauma care. The study was approved by Institute Ethical Board. All participants or their by standers consent was obtained before enrolling in to the study. The data was collected on a predesigned proforma that is compatible with Computerized Management System. The electronic data entry interface was developed by FileMaker Pro Advanced 13 (Copyright © 1994-2015, FileMaker, Inc) and web data entry interface Drupal CMS (<http://www.neuropractices.com/node/add/tbi-registry>). The trauma registry proforma constitutes core data variables that are important for trauma patients as suggested by Utstein template (4). For the present study mainly focusing on pre hospital care we have

selected variables like; primary aid, referral centre, by stander (person assist trauma victim), transportation and early basic life support measures.

## Statistical analysis

Analysis of data was done using Stats Direct version 3.0.150 (StatsDirect Ltd. StatsDirect statistical software. <http://www.statsdirect.com>. England: StatsDirect Ltd. 2015.). For the categorical data, frequencies and percentages were calculated and for continuous variables, mean and standard deviation was determined. Significance among categorical data was evaluated using Chi square test with significance level of lesser than 0.05.

## Results

During study period 337 head injury patients' data was documented. From 2013, 2014, 2015 there were 77 (22.8%), 220 (65.2%) and 40 (11.8%) patients, respectively. The mean age was  $36.26 \pm 15.86$  years. Males were four times more than females. The details of patient's first aid, referral, by stander and transportation are described in table 1. Only one victim worn helmet and car seat belt was inserted by one individual. The hospital advance life support like Airway, Breathing and Circulation was significant with outcome at discharge. Refer table 2 for more details. In circulation category cardiopulmonary resuscitation was performed in three patients and all were expired. Twenty four (7.12%) patients expired during study period.

TABLE 1

Shows frequency and percentages of safety measures, referral, by stander and transportation

	Frequency	Percent
<b>First aid</b>		
No	110	32.6
Yes	227	67.4
<b>Referral details</b>		
Patient brought directly to trauma centre	137	40.6
Private hospital	12	3.6
Government hospital	6	1.8
Not available	182	54
<b>Patient brought by</b>		
Relatives	296	87.8
Spouse	29	8.6
Self	2	0.6
Friend	1	0.3
Unknown	1	0.3
Missing	8	2.4
<b>Transportation</b>		
Ambulance	86	25.6
Public vehicle	106	31.4
Police vehicle	2	0.6
Not available	143	42.4

## Discussion

The study result reports that only one victim had taken safety measure by wearing helmet and securing seat belt. About two third patients were given first aid before appearing to tertiary emergency centre. Forty percent of patients approached emergency by themselves. Majority of patients accompanying person was patients relative (87%), followed by spouse (8.6%). Transportation by public vehicle (31%) was more than ground ambulance transportation (25%). Emergency life support approaches like airway, breathing and circulation was significant with discharge outcome.

TABLE 2

Depicts Advanced Trauma Life Support with alive or death outcome at discharge

Sl No.	Variables	Outcome		P value
		Alive	Dead	
1	<b>Airway</b>			<0.001
	Clear	194	6	
	Incubated	90	13	
	Adjunctive	70	1	
	Obstructed	4	0	
2	<b>Breathing</b>			<0.001
	Spontaneous, adequate	189	5	
	Mechanical Ventilation	61	16	
	Spontaneous, insufficient	41	2	
	Unknown	4	0	
3	<b>Circulation</b>			<0.001
	Intravenous fluids	285	20	
	Cardio Pulmonary Resuscitation	0	3	
	No specific treatment	20	1	

The present study deals with TBI patient's data from a tertiary emergency centre. About three fourth of patients are from rural setup and remaining is from urban area. From the results it is obvious that patients did not take any safety precautions while travelling in vehicle. Patients from urban area did not take any safety precautions then from rural setup it is difficult to expect. This shows that victims are either negligent or violating the rules. The World Health Organization (WHO) reports that middle and low income countries

especially from Asia reports with very low percentage of helmet usage. (5) In spite of implementing strict guidelines and adopting preventive strategies for vehicle users, still they are unaware or negligent in using safety precautions.

The present study reports that 70% of patients from rural and 60% of patient from urban have undergone first aid before reaching tertiary centre. Victim sustaining head injury will be generally shifted to nearest local hospital where general evaluation will be done. Further any requirement of CT scan or sensorium deterioration or non-availability of neurosurgeons the patient will be shifted to tertiary hospital. A study from a metropolitan city reports that 87% of patients had first aid before reaching referral trauma centre. (6)

Mild head injuries constitutes majority of TBI population and majority of patients may suffer from post-traumatic symptoms in multi spectrum which causes them to worry and meet the concerned specialist especially during acute and sub-acute phase of injury. (7, 8) This may be the possible reason for patient them self to approach treating doctor. Injured patient accompanied to emergency by a person is very important. (9)

The literature on same is insufficient. The present study reports that majority of patients were accompanied by relatives followed by spouse. In trauma circumstances, injured victim should be transported to hospital or trauma unit as early as possible. Mode of transportation had an significant effect on patient outcome. (9, 10) Studies from lower and middle income strata, reports that a substantial number of emergencies were

transported by non-ambulance vehicles. (9, 11) A study from Mumbai found about 35% of trauma patients were transported to the main trauma center via ambulance. (12)

Our study reports patients from both rural and urban areas, where bulk of transportation is by private vehicle and followed by ground ambulance. Pre hospital care during early phase of injury is very crucial as it has potential effect on outcome of injured patient. (13)

Our country with huge rural setup has limited access to basic life support. The first responder with basics of managing emergencies by non-invasive method has a potential fruitful avenue. The care of airway, oxygen supplementation, cardiopulmonary resuscitation, and stopping of the external bleeding, immobilization of the fractures at accident spot and careful transportation without further damage is very important. (14) But these facilities are lagging in our setup. Most of the private hospitals at both rural and urban refer TBI patients to tertiary trauma unit. The availability of well-trained basic life support staff is deficient in most part of our country especially in rural areas. The present study reports that airway and breathing management at emergency is significant with outcomes at discharge.

### **Limitation**

The study has chosen few variables from trauma registry that is specific for the paper. The variables are not complete for pre hospital care. The deficient variables will be upgraded in next phase of data collection. The study has focused on only few variables but however the

variables have much impact on outcome of TBI and of public interest.

## Conclusion

The pilot study reports that majority of TBI patients had undergone first aid and private transportation is most common mode of transportation to reach trauma unit. The emergency management of airway, breathing and circulation has significant effect on discharge outcome. Detail studies with larger sample and multi hospital level should be planned to get better overview of pre hospital care in our country.

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