Study of Railway Fatalities in Barpeta, Assam

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Abstract

Indian railway is one of the largest railway networks in the world. Although the fatalities are less than the road traffic accidents, railway accidents have a major impact in victims' lives. A total of 58 cases of death due to railway incidences were studied in the dept. of forensic medicine, FAAMCH, Barpeta, Assam, during the years 2015 and 2016. The demographic patterns including injuries, time of death and causes of deaths were studied. Males outnumbered the female victims. The majority of the railway accident cases are in the age group of 31 to 40 years. The patterns of injuries in death due to railway accident may vary according to the position or the different situations where accidents struck. The majority of deaths were due to head injury.

Keywords: Railway, accident, injury, fatalities

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INTRODUCTION

The rail transport system first appeared in England in the year 1820s. The railway was first introduced to India in 1853 from Bombay to Thane. The United States has world's no. 1 largest railway network and India is on the 4th position after Russia and China. In Indian railways, more than 22.2 million passengers travelled per day or 8.107 billion passengers annually during 2015–2016 [1]. Indian railway ran, on average, 13313 passenger trains daily in 2015–16. Mail or express trains are most common type [2].

According to NCRB, a total of 29419 cases of railway accidents were reported in the year 2015 and 26066 cases were deaths [3]. Fall from trains or collision with people at track constituted majority of railway accidents (72.5%). A total of 2669 cases of railway crossing accidents were reported, which caused 2650 deaths and 123 persons injured during 2015. Haryana has reported the maximum cases of railway crossing accidents (48.5% deaths of total RA fatalities). Maharashtra and Uttar Pradesh had highest fatalities in railway accidents, accounting for 18.1 and 17.2% of total deaths in railway accidents respectively. In Assam, 10 persons (8 males and 2 females) died due to railway crossing accidents and 664 (males 603 and females 61) died due to railway accidents during the year 2015 [3]. In the year 2015, 3304 numbers of death cases were recorded in Mumbai local train (The Hindu).

In the United States, train related accidents account for more than 18000 injuries and 1200 fatalities annually [4]. There are 43 non-suicide fatalities and 314 were suicidal fatalities recorded in the Great Britain railway network during 2014–2015. There were no passenger fatalities in train accident in Great Britain during 2014–2015 [5]. Most railway disasters (74%) during 1970–2009, occurred in Asia and Africa, whereas Europe and Americas have experienced a decreasing trend. On the Asian Continent, India reported the most railway disasters (45%). In Europe, Russia reported the most railway disasters (18%) [6]. In China, 1336 people died in railroad accidents in 2013 and 1232 people died in the year 2014 [7].

The development of railway sector has resulted in the increase in the train traffic throughout the world. Simultaneously, numbers of accidents also increased in railway sectors. Indian railway has played a key role in India's social and economic development. It is a cheap and affordable means of transportation for millions of passengers. Barpeta Road

railway station is a main railway station in Barpeta district, Assam. It serves Barpeta Road as well as Barpeta Town.

MATERIAL AND METHOD

The present study of 58 death cases of railway incidence brought for post mortem examination by GRPS, Barpeta Road, has been carried out in the dept. of Forensic Medicine, FAAMCH, Barpeta, Assam, in a period of two years from 1st January 2015 to 31st December 2016. The data were collected from police, relatives and the autopsy findings. All the data were analyzed and findings were recorded. The post mortem examination was done as per the standard.

RESULT AND OBSERVATIONS

A total 1022 cases of post mortem examination were carried out in the Department of Forensic Medicine during the years 2015 and 2016; out of which 58 (5.7%) numbers of cases were deaths due to railway accidents (Figure 1). Maximum numbers among the cases were males, that is 37 (63.8%) and 21 (36.2%) were females. Male and female ratio was 1.8:1. Maximum victims (34.5%) were 31–40 years old, followed by

21–30 years of age group that is 25.9% (Table 1).

Table 1: *Age and Sex Distribution.*

S. No.	Age Group	Male	Female	Total	%
1	0–10	0	0	0	
2	11–20	4	3	7	12.1
3	**21–30**	**9**	**6**	**15**	**25.9**
4	**31–40**	**12**	**8**	**20**	**34.5**
5	41–50	5	2	7	12.1
6	51–60	4	2	6	10.3
7	61–70	2	0	2	3.4
8	71–80	1	0	1	1.7
	Total	37	21	58	100

Maximum cases (96.6%) were died on the spot and only 3.4% cases were death on the way to health center. Maximum numbers of incidents, that is, 26 (44.8%) occurred in between 6am and 12noon. 20, 7 and 5 numbers of cases occurred in between 12noon and 6pm, 6pm and 12 midnight, and 12night to 6am respectively. The maximum cases were found in summer season, that is, 21 (36.2%), followed by autumn (27.6%), spring (19%) and winter (17.2%) (Figure 2).
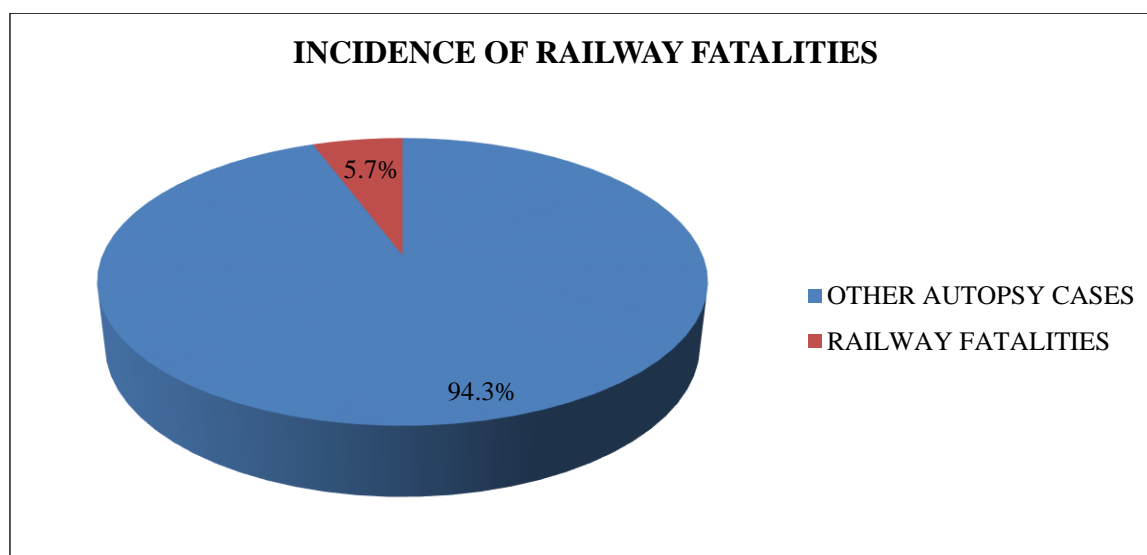

Fig. 1: *Incidence of Railway Fatalities.*

Table 2: *External Injuries.*

Injury	Head	Neck	Upper Limbs	Lower Limbs	Chest	Abdomen	Pelvic
Ab	8	2	19	20	11	7	2
Con	10	0	0	1	0	4	0
Lac	25	0	18	21	1	7	8
Cr	14		6	12	4	5	4

Ab: Abrasion, Con: Contusion, Lac: Laceration and Cr: Crush.

Different types of injuries are described in the Tables 2 and 3; the maximum numbers have been highlighted. The maximum numbers of injuries were found in head followed by upper limbs and lower limbs. Separation of bodies was found in 3 (5.2%) cases and all the cases separated at the level of abdomen.

Table 3: Internal Organ Injuries.

Organ	Contusion	Laceration	%
Lung	5	21	**44.8%**
Heart	3	7	17.2%
Liver	6	20	**44.8%**
Spleen	2	19	36.2%
Kidney	5	18	**39.7%**
Stomach	2	12	24.1%
Intestine	6	9	25.9%
Bladder	5	16	36.2%

It was found that 17 (29.3%) cases were suicidal deaths and 41 (70.7%) were accident deaths. 8 (13.8%) cases of accidents occurred due to hit by train while they were walking along the side or through the track, 11 (19%) cases were accidental fall and 9 (15.5%) cases were deaths due to jump from the train while moving. 13 (22.4%) cases were those with history of crossing the track. Maximum cases were deaths due to head injuries, that is, 31 (53.5%) followed by instantaneous deaths (29.3%) and hemorrhage and shock (17.2%).

DISCUSSION

In the study, 58 (5.7%) cases of railway incidences among a total 1022 autopsies at Barpeta during the years 2015 and 2016 were considered. In India, a total of 496762 traffic accidents were reported during the year 2015, which include 2669 (0.5%) railway crossing accidents and 29419 (5.9%) were railway accidents. The percentage share of deaths in railway accidents and railway crossing accidents was reported as 14.7% (26066 deaths) and 1.5% (2650 deaths) respectively during 2015 (NCRB) [3]. Similar findings on railway incidences were observed by Wasnik (5.99%) [8], Bose *et al*. (6.11%) [9], Hussaini *et al*. (4.51%) [10], Chandru *et al*. (4.65%) [11], and Dalal *et al*. (15.53%) [12].

In the study, males 37 (63.8%) outnumbered the female (36.2%) victims. The maximum numbers of victims were in the age group 31 to 40 (34.5%), followed by 21 to 30 (25.9%). In India, maximum numbers of cases, both railway accidents and railway crossing accidents were age group in between 30 and 45 years, followed by 18 and 30 years [3]. Ozdogan *et al*. observed that majority of the fatalities were males (77%) for every types of incidents, and train pedestrian accidents were the most common causes of fatalities for all age groups [13]. Silla *et al*. observed that 51.4% of all accidents happened to people aged 10 to 29 years and 44.3% of the suicidal victims' age group were 20 to 39 years [14].
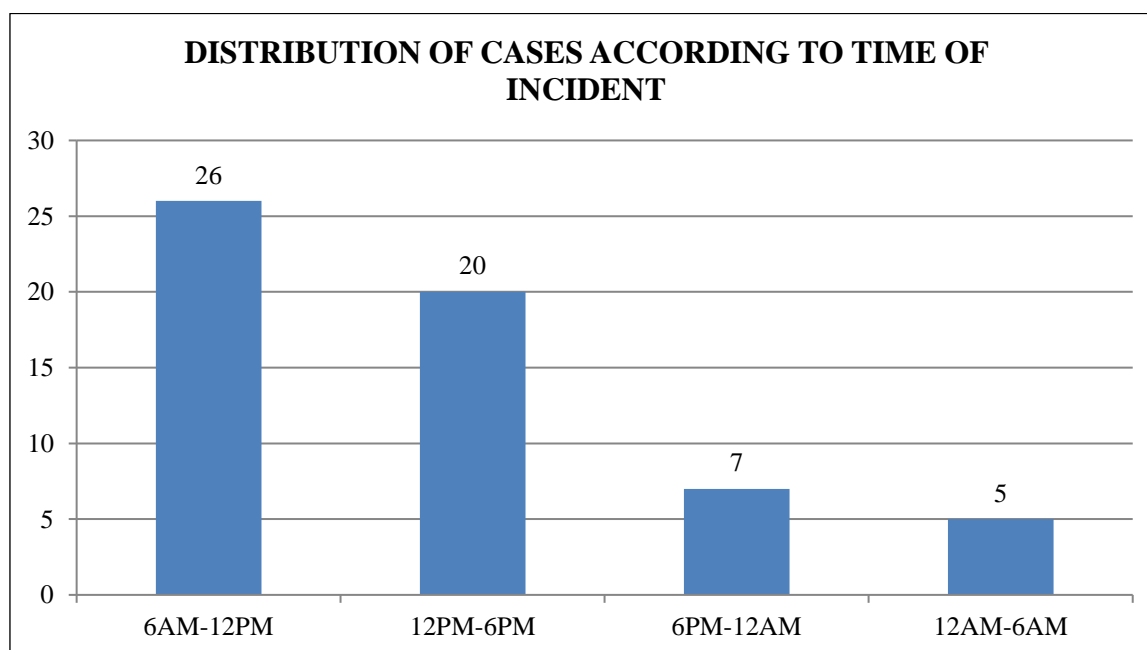

Fig. 2: Distribution of Cases according to Time of Incident.

Majority of victims (96.6%) died on the spot. It was due to severe injuries or sometimes incidence took place in remote area. Washik observed that 96.53% cases died on the spot [8]. Hussaini *et al.* observed that majority of victims died on the spot (91.37%) [10]. In the study, majority of fatalities (44.8%) occurred in between 6am and 12noon, followed by 12noon and 6pm (34.5%). According to NCRB report in India, most of the railway accidents (4966 out of 28366) were reported during 6 to 9 h, 17.5% of total railway accidents were reported during 9 to 12 h. Silla and Luoma observed that suicide occurred mostly in afternoon, evening and midnight; on the other hand, maximum accidents occurred during rush hour that is 3pm to 6pm. In the study, maximum cases were found in summer season (36.2%) [14]. Similar findings were observed by Ozdogan *et al.* and Hussaini *et al.* in their studies [13, 10]. According to NCRB in India, most of railway accidents were reported in the month of August, contributing 8.7% of total railway accidents. Silla and Luoma observed that 52% of suicide cases were found in May, July, August, November and December; and most of the accidents occurred in the month of March and Nov [14]. Caird *et al.* observed that maximum cases were found in December and January, and less fatality occurred in July [15]. They also observed that 40% of fatalities occurred in between 9.30am and 3.30pm.

There were maximum 25 numbers of lacerated injuries and 14 crush injuries present over the head, followed by injuries present in both upper and lower limbs. Valsala *et al.* classified the victims in to two groups: one, pedestrian walking along the side of or through the track and second, pedestrian while crossing the rail track [16]. They observed that head injuries were maximum in both groups that is 82.3 and 91% respectively. Hussaini *et al.* observed that commonest involved region was head (54.31%) followed by upper and lower limbs (63.79%) [10]. In the study, maximum numbers of contusion and laceration injuries were found in lungs, liver and both kidneys. Wasnik observed that maximum numbers of injuries were found in lungs (88.65%) followed by liver (41.75%) [8].

In the study, 70.7% of cases were accidental deaths and 29.3% of cases were suicidal in nature. Similar findings were observed by Chandru *et al.* (accidental deaths 86.15% and suicidal 13.85%) [11], Roopkumar *et al.* (accidental deaths 71% and suicidal 29%) and Ozdogan *et al.* (accidents deaths 76.4% and suicidal 21.8%) [17, 13]. The accident rate is high due to carelessness, ignorance of the people or disobeying traffic rule or safety rule. But Silla and Luoma observed that suicidal incidences were 84.9% [14]. In England and Wales railway suicides account for 90% of total railway fatalities during the year 2014 to 2015. Taylor *et al.* observed that railway suicide accounted 4.1% of all suicide in England and Wales during the period 2000 to 2013 [18]. They observed that proportion of railway suicide was higher in other Western European countries than Great Britain; it accounted for 5% of all suicides in Belgium, 7% of all suicides in Germany and 11.5% of all suicides in the Netherland. It is observed that railway suicide is a highly lethal suicidal method [19–21].

In the study, 11 (19%) cases were deaths due to fall, 9 (15.5%) cases were deaths due to jump from the train while moving, 8 (13.8%) cases deaths due to hit by the train and 13 (22.4%) cases were history of crossing train. Ozdogan *et al.* observed that 42.4% of railway fatalities occurred due to train pedestrian accidents, 5.9% cases deaths due to falling from the train and 28.1% fatalities were due to level crossing accidents [13]. Silla and Luoma observed maximum cases (10 out of 35) were deaths during the crossing the tracks. In our study, two cases were fatalities which occurred during crossing the tracks while they were using mobile headphones [14].

In the study, causes of maximum deaths were due to head injuries, that is, 53.5%, followed by instantaneous deaths, that is, 29.3% and lastly, hemorrhage and shock (17.2%). Wasnik observed that 64.73% of fatalities were due to injuries to vital organs, followed by 19.65% due to hemorrhage and shock and 15.02% were due to head injuries [8].

CONCLUSION
Most of the railway fatalities were accidental in nature. Males outnumbered the females and maximum fatalities were in between 21 and 40 years of age group. Maximum causes of

deaths were due to head injuries. The railway authority should take some steps to prevent the accidents by strict law enforcement, training and awareness of staff as well as the public. Where the population density is high and train traffic is dense, limitation of pedestrian access to the tracks by using fencing and physical barriers, monitoring and detection systems like motion detectors, video cameras, infrared cameras and speakers should be introduced. High-risk location should be identified.

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