



## ORIGINAL RESEARCH PAPER

Forensic Science

## Study of epidemiology of railway accidents in Kamrup district

**KEY WORDS:** accidents, males, pedestrians, vigilance**Dipankar Thakuria**

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**ABSTRACT** Railway accidents are a leading cause of accidental deaths in India. Hence a study to find the epidemiological data in such deaths can lead to predicting and mitigating such deaths. In our study it is found that males are the most affected with the age group between 21-30 the most involved. Businessmen were the most involved group and most of the accidents occurred between 6-12 am. Pedestrians who are knocked down are the people who are most involved in such accidents. Self-vigilance on the part of the passengers and adherence to the rules & regulations safe practices will help prevent railway accidents.

**Introduction**

The Indian Railways is one of the largest and busiest rail communication networks in the world touching remotest corners of the country covering almost all the states. India has a dubious distinction of highest number of accidents both in roads and rail tracks. Railway accidents may be referred to as collisions, derailments or other event involving the operation of on-track equipment<sup>1</sup>. They cause devastating damages and personal injuries including death due to the speed and tremendous weight of the railway machineries. With fast pace of commercialization and globalization in all spheres of life, the railways have gone a long way but safety has always been a concern. The increased number of railway casualties has augmented the burden of a Forensic Medicine expert. Close observation of epidemiological data can help the railway administration to verify the cases liable for compensation and also formulating ways for safety measures

**Aims and objectives**

- To analyze the socio-demographic profile of the victims in terms of,
  - Age, sex, religion
  - Occupation, educational background
  - Marital status, socio-economic background
  - Personal habits like intake of alcohol, tobacco etc.
- To figure out the type of train involved in the incident

**Materials and Methods**

A cross sectional study has been carried out on the victims of the autopsies that are carried out in the mortuary of the department of Forensic medicine, Gauhati Medical College. The study period extended from 1<sup>st</sup> July, 2014 to the 30<sup>th</sup> June, 2015. During this period a total number of 2964 autopsies were carried out in the department.

The criteria for selection of cases in this study are as follows:

- All autopsies where death occurred unnaturally by railway tract injuries are taken as case for the study.
- Autopsies where death occurred due to natural causes in or near the railway station were excluded from the study.
- The cases included both known and unknown victims of railway tract injury deaths as well as decomposed bodies.

**Results**

A total of 2964 numbers of medico-legal autopsies were performed in the Department of Forensic Medicine, Gauhati Medical College, Guwahati during the study period from 1<sup>st</sup> July, 2014 to 30<sup>th</sup> June 2015. Out of these 85 numbers of cases were deaths due to railway tract incidents.

**AGE DISTRIBUTION**

In the present study, the age of the victims were divided according to their age into 7 groups. The age wise distribution of cases is shown in the table.

**Table: Age distribution of cases**

Age Group (Years)	No. of Cases	Percentage
0-10	1	1.17
11-20	15	17.64
21-30	23	27.05
31-40	17	20
41-50	19	22.35
51-60	7	8.23
>60	3	3.52
Total	85	100

The peak incidence is seen in the age group of 21-30 years with 23 cases (27.05%) followed by age group 41-50 years with 19 cases (22.35%).

Among the 85 cases with railway injuries 72 cases were male comprising 84.7% and 13 were female comprising 15.3% of the total cases.

**SEX DISTRIBUTION OF THE CASES**

The following table shows the sex distribution of the victims.

**Table: Sex distribution of the victims in the study**

Sex	No. of Cases	Percentage
Male	72	84.7
Female	13	15.3
Total	85	100

It is observed from above table that among the 85 cases with railway injuries 72 cases were male comprising 84.7% and 13 were female comprising 15.3% of the total cases.

**OCCUPATION**

Details of occupation-wise break-up of victims are given in the table below.

**Table: Occupation of the victims**

Occupation	No. of Cases	Percentage
Business	17	20
Service	6	7.05
Student	15	17.6
Labourer	11	12.9
Housewife	4	4.7
Unemployed	3	3.5
Maid	1	1.1
Not Known	28	32.9
Total	85	100

It was found that 17 victims were businessmen followed by students and service holders. The occupation of 28 cases could not be determined at the time of autopsy as these were reported as unidentified cases.

**THE EDUCATIONAL STATUS OF THE VICTIMS**

The educational qualifications of the victims are categorized in the table below:

**Table: Educational qualification level of victims**

Level of education	Number	Percentage
Graduate	6	7.05
Matriculate	13	15.3
Primary	10	11.7
High-school	18	21.1
Illiterate	10	11.7
Not Known	28	32.9
Total	85	100

It is observed that most of the victims in the present study were having education up to high school level with 18 cases (21.1%). The educational qualification of 28 cases could not be determined at the time of autopsy as these were reported as unidentified cases.

**SOCIO-ECONOMIC CONDITION**

Most of the victims in the present study were from low socio economic group with 32 cases (37.64%) and middle class. The socio economic status of 28 cases could not be determined at the time of postmortem examination as these were reported as unidentified cases.

**PERSONAL HABIT**

For detection of level of alcohol or other drugs no laboratory examination was done. From proper history taking, it is found that out of 85 cases, isolated tobacco consumption seen in 11 cases, followed by alcohol and tobacco consumption together with 9 cases, then betel nut and gutkha consumption with 1 case each while 27 cases did not have any such personal habits. The personal habit of 28 cases could not be determined at the time of autopsy as these were reported as unidentified cases.

**DIURNAL VARIATION**

The highest number of incidents in the present study occurred in between 6 AM to 12 noon comprising of 26 cases (30.58%) followed by 12 noon to 6 PM comprising of 23 cases (27.05%).

**TYPE OF VICTIM**

Different types of victim and their percentage are given in the table.

**Table: Different types of victims**

Type of victim	No. of cases	Percentage
Pedestrian	67	78.82
Passenger	9	10.58
Not Known	9	10.58
Total	85	100

It is evident from the table that most of the victims were pedestrians comprising of 67 cases (78.82%) followed by passengers comprising of 9 cases (10.58%).

**TREATMENT HISTORY**

Most of the victims died without receiving treatment comprising of 73 cases but 12 victims were fortunate to get treated but to no avail.

**TYPE OF TRAIN INVOLVED**

The type of train involved in causing the railway tract incidents is given in the table below.

**Table: The type of train involved.**

Train	Number
Mail	2
Engine	1
Express	38
Passenger	18

Goods	7
Not Known	19
TOTAL	85

In 19 cases the type of train could not be traced out. Among the known cases express train was found to be most commonly involved with 38 cases.

**Discussion**

The findings of present study are quite similar to Basu R<sup>2</sup>, Sabale PR<sup>3</sup>, Sheikh MI et al.<sup>4</sup>, Wasnik NR<sup>5</sup>, The preponderance of this age group is due to requirement of more travelling for earning and lead a stable life.

The findings of the present study are similar to that of Roychowdhury UB et al.<sup>6</sup>, Sabale PR.<sup>3</sup>, Sheikh MI et al.<sup>4</sup>. and Wasnik NR<sup>5</sup>. This can be explained by the fact that in the modern world males remain the major earning members of the family, so they are exposed to risks and accidents in every step of life. Also the rush to get to work has led to increased number of cases in the early hours of the day.

Due to lack of proper treatment most of the victims are not able to reach a hospital setup leading to increased casualties. Express trains with greater speed are the most involved in casualties as people get less time to react and save themselves. The preponderance of people who died while crossing the tracks brings to light the fact that people are negligent of railway rules and avoid safety precautions. Also it brings to light that in India the number of unmanned crossovers are very high leading to casualties.

**CONCLUSION**

A set norm of railway safety, high quality of maintenance and vigilant supervision by the railway authorities along with required awareness among the people can make rail-travel much safer. Implementation of newer technology like anti-collision device, modern signaling devices like panel inter-locking, route relay inter-locking, centralised traffic control, automatic signalling and multi-aspect colour light signalling, are the need of the hour. Regular repair and maintenance of the tracks, the train machineries and existing communication devices will automatically reduce some avoidable railway accidents.

There is lack of first aid to the injured at the stations; and also lack of definitive shifting facilities. Hence there is a considerable time lag between accident and admission to the hospital. The deaths that occurred due to extensive blood loss and hypovolemic shock could possibly have been prevented. Therefore, ambulances with para-medics should be present in every stations. Public awareness regarding railway safety should be spread by involving various social groups, media etc. Self-vigilance on the part of the passengers and adherence to the rules & regulations safe practices will help prevent railway accidents. This effectively includes avoiding crossing of rail-tracks, no hanging outside trains, no sitting on train roof-tops and no jostling while boarding or alighting from the trains, especially moving trains.

Railway related deaths are taking place day by day leading to increased autopsies and this study makes an effort to emphasize the need to understand the injuries in a better way and in turn help to decipher the weaknesses of the railway mechanism which led to such tragic mishaps.

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