

MUMBAI LOCAL : BACKBONE OF THE CITY OR BURDEN ON PUBLIC SAFETY

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ABSTRACT :

Mumbai is financial and commercial capital of India. Mumbai wouldn't have achieved this without the lifeline of the city-its local trains. Aim of our study was to find out most demographic profile manner and causes of death in railway deaths. Total number of 51 railway death cases was noted during study period. Most of the deaths belonging to younger age group 21 to 30 yrs (28%). Males (96.07%) preponderance was observed in our study. Maximum numbers of railway accidents were seen during the evening hours between 1600 to 2000 hrs. The majority of the victims were brought dead 27(52%). Greatest number of deaths were accidental (98%) in nature. There were less suicidal cases (02%) and no case of homicidal death noted. Most common reason behind railway deaths was hit by train while crossing railway track 48% and 30% had fallen from running train due to overcrowding. Intracranial hemorrhage due to Head injury (47.05 %) was most common cause of death. Railway accidents can be preventable by taking appropriate measures such as attentive surveillance, ambulance availability at stations, safety engineering and awareness among passengers.

KEY WORDS :

Railway deaths, Mumbai local train, Accidental, Head injury.

CHAPTER 1

INTRODUCTION:

1.1. INTRODUCTION OF THE TOPIC :

The Indian Railway network (IRN) is one of the largest and busiest Railway networks in the world, handling massive numbers of passengers and quantities of goods daily. Railways are the most popular means of long-distance transportation in India; hence the IRN is often described as the backbone of this nation's economy. More alarmingly, there has been a spate of Railway Accidents in India, leading to loss of a significant number of human lives. [1] The local trains are essential for a speedy cross-over of a large, densely populated urban area like Mumbai over long distances.

Millions of people travel regularly and commute by local trains over varying distances ranging from 10 to 60 kilometer a day. [2]

The major problem with these trains is overcrowding due to extensive population. Over 4,500 passengers are packed into a 9-car rake during peak hours, as against the rated carrying capacity of 1,700. [3]

Many fatalities have been reported due to excessive crowding. Over the past 10 years (2002-2013), in our country, more than 46,476 lives have been lost on tracks and 43,834 people have been injured. Train accidents on suburban Mumbai local routes have claimed 23,473 lives in the past 11 years. This takes the average for injuries and deaths per day to 10. [4]

Main reasons are over-crowding, illegally crossing the railway tracks, standing on the foot boards of the doors of the compartments, electrocution due to commuters sitting on the roof of trains and Impact with Railway Electric Poles. Travelers leaning out of local trains due to overcrowding and poor ventilation inside the train are at a risk of being hit by electric poles that are all along the tracks leads to a lot of accidents during the crowded hours. Unfortunately, Mumbai's Suburban Trains have among the Highest Number of Accidental Deaths among suburban railway networks in the world. This type of study is not carried out in central Mumbai region; hence an attempt is made here to study the railway deaths.

1.2 MATERIAL AND METHODS :

A prospective study was conducted in Department of Forensic Medicine and Toxicology at Seth G.S. Medical College and KEM Hospital, Parel, Mumbai during the period September 2013 to August 2014. Out of 1444 medico-legal autopsies conducted during this period, 51 cases (3.53%) were due to train accidents. The data regarding information on age, sex, supposed manner of death and pertinent history was obtained from police papers (Requisition and inquest Panchnama), hospital records, statement from relatives, and report from station manager and autopsy report. All data are analysed and statistically treated with SPSS program.

Inclusion Criteria: All railway-related fatalities confirmed for medico-legal autopsy in study time frame. Cases of accidental fall from train, run-over injuries, accidents at the platform area and crossing till end. Bodies identified and unidentified associated with railway accidents.

Exclusion Criteria: Bodies so decomposed that cause of death could not be established. Incidents not directly connected to the railway. Lack of records or police reports.

Study Variables: The following variables were studied:

Age distribution

Gender distribution

Time and location of incident

Crossing case (fall from train, run-over, collision)? Type of injury (head, thoraco-abdominal, multiple injuries)

Survival from (spot death or hospital death)

Circumstance of death (accident, suicide, homicide)

Data Collection Method: External and internal examinations were performed following routine autopsy protocol. Injury patterns were documented systematically. Where applicable it was photographed and documented. When indicated, toxicological samples (viscera, blood and urine) were conserved and submitted for chemicoassays.

Statistical Analysis:

Data were entered in Microsoft excel and analysed using SPSS version XX Descriptive statistics (i.e., frequency, percentage, mean and standard deviation) were computed. Presented results in the form of tables and charts for easier interpretation.

Ethical Considerations:

The ethical approval for the study was obtained from respective institutional authorities. The identity of the dead individuals was strictly kept confidential throughout this study.

CHAPTER 2

OBSERVATIONS AND RESULTS :

In this study most common age group involved in railway deaths was (21-30 years) 14 cases (27.45 %), followed by (41-50 years) 12 cases (23.52 %), (31-40 years) 7 cases (13.72 %) and least in (11-20 years) 5 cases (9.8%).

If we combine age group 21-30 years and 31-40 years then it was observed that almost 34% of deaths occurred in younger age group. (Fig. 1) Male preponderance was observed in our study contributing almost 98% of the total railway deaths. While only 2% cases belonging to female which are seen in (21-30 years) 1 and (41-50 years)

Present study showed that most common time of incidence is between 1600-2000 hrs. During the evening hours 13 cases (33.33 %), followed by 0800 to 1200 hrs 8 cases (20.51 %) and least in 0000 to 0400 hrs. 2cases (5.12 %). (Fig. 2)

In this study most of the victims were brought dead 27(52.94%) cases while 21 (41.17%) cases were survived for more than 24 hrs. In our study and only 3(05.88 %) cases were survived for less than 6 hrs. (Table 1) Maximum number of deaths were accidental (98%). There were less suicidal cases (02%) and no case of homicidal death noted. (Fig.3)

Present study showed that common reason behind the incidence was hit by train while crossing the track 26 cases (50.9%), followed by fall from running train 18 cases (35.29%), hit by pole 03(5.88%), fall through gap between platform and train 03(5.88%) and least was observed in electric shock due to overhead wire 1(1.96%). (Table 2)

Most common cause of death in our study was intracranial hemorrhage (head injury) due to blunt trauma 24 cases (47.05%) followed by shock and hemorrhage due to blunt trauma 18 cases (35.29 %), injury to lungs due to blunt trauma five cases (09.80%) and least common were septicemia and pneumonia as a complication of blunt trauma each 02 (03.92%).(Table 3) Most of cases 37(80%) did not get facility of ambulance after the incidence. (Fig. 4)

We observed in this study that most of the railway death took place at Parel to Curry road station 17 cases (43.58%), followed by Chinchpokli station 6 cases (15.38%), Elphinstone station 5 cases (12.82%), Dadar station 4 cases (10.25 %) and least common in Andheri to Jogeshwari 2 cases (5.12%). (Fig. 5)

CHAPTER 3

DISCUSSION :

In our study male (98%) predominates the females. this might be due to fact that males carry most of the responsibilities of their families like earning and care taking of their family.

In city like Mumbai where a common man cannot take house or rent in proper Mumbai, he has to reside in sub-urban region hence he has to travel a lot. Female also travel through local but they are more careful than males while travelling. Similar study in Nagpur region by Wasnik [4] stated that males (89%) predominates females (11%) this might be due to the fact that most of the outstation activity was carried out by males. Our study is also similar to other researchers work. [6-9]

While study carried out in Varanasi [5] is contrast to our study. This might be due to fact that females are more exposed to stress and occupational hazard

Most common age group involved was 21-30 years (27.45%), followed by 41-50 years (23.52 %), 31-40 years (13.72 %) and least in 11-20 years (9.8 %). If we combine age group 21-30 years and 31-40 years then it was observed that almost 34% of deaths occurred in younger age group. [4-10]

This might be due to fact that young peoples are more active and they take more risk as compared to others. They will try to board in running train, hanging on doors or bars, travelling on the roof in overcrowded trains.

Most common time of incidence was 1600 hrs to 2000 hrs (33.33%), followed by 0800 hrs to 1200 hrs (20%) and least common in 0400 hrs to 0800 hrs (11.76%.) This might be due to the fact that evening is time at which most of the offices closed and peoples rushing to their home. Similarly morning is also time at which most of the offices start their working.

At 0400 hrs.to 0800 hrs (Early morning)incidence was very low due the fact that most of the offices are not open.

Majority of the victims were brought dead (died on spot) 27(52.94%) cases while 21 (41.17%) cases were survive for more than 24 hrs. similar to Wasnik [4] study in Nagpur region which stated that majority of victims died on spots (96.53%). This might be due to fact that railway injuries sustain during accidents were fatal and lack of ambulance services

Accidental deaths (98%) outnumbered the suicidal deaths (2%) and no case of homicidal deaths in our study. This might be due the fact that high population of the city, overcrowding of locals at peak hour, narrow foot over bridge, hanging on doors, hit by train while crossing the track in hurry and travelling on the roof. While a very low suicidal deaths, might be due to the fact that this is a very violent method of suicide, consistent with other studies. [4, 5 11, 12] Most common reason behind the incidence was hit by train while crossing the track 26 cases (50.9%), followed by fall from running train 18 cases (35.29%), hit by pole 03(5.88%), fall through gap between platform and train 03(5.88%) and least was observed in electric shock due to overhead wire 1(1.96%).

This might be due to the fact that Mumbai is highly populated city, fast lifestyle; peoples are in hurry to reach their offices and homes, insufficiency of foot over bridge, narrow foot over bridge, hence compelling them to cross the track to reach their destination in time. Overcrowding results in fall from running train and also vertical poles along the track.

In majority cases common cause of death was intracranial hemorrhage (head injury) due to blunt trauma (47.05%) followed by shock and hemorrhage due to blunt trauma (35.29%).

This might be due to the fact that in our study most common reason behind the railway deaths was hit by train while crossing the train and local is having two protrusions on its front which is at the head level of the person which may hit head as primary impact during the crossing of the track. [4]

Most of the railway death took place at Parel to Currey road station 17 cases (43.58 %), followed by Chinchpokli station 6 cases (15.38 %) and Elphinstone station 5 cases (12.82 %).

This might be due to the fact that only one narrow foot over bridge at parel station, overcrowding and at the peak hours people are in quick rush hence they compel to cross the track and hit by train. Also insufficiency of barriers between the two tracks, vertical poles between Parel to Currey road station and inadequate frequency of trains are also other reason.

CHAPTER 4

METHODOLOGY :

Study Design:

The current study is a mixed-methods investigation, integrating both quantitative and qualitative methodologies. The study intends to analyze the double facet of Mumbai Local trains as the structure of urban mobility and its implications on public safety.

Study Area:

Study was carried out in Mumbai Metropolitan Region (MMR) including major Suburban railway lines such as Western Line, Central Line and Harbour Line. Some of the selected railway stations were Dadar, Kurla, Andheri, Thane and CST.

Study Population:

The study population consisted of:

Mumbai Local trains daily commuters

Railway employees (ticket collectors, station masters, RPF personnel)

Victimes des accidents de chemin de fer (Secondary Data Analysis)

Sample Size and Sampling Technique During peak and non-peak hours, 200–300 commuters were sampled using convenience sampling. Furthermore, secondary data for railway accidents spanning the past 5–10 years were obtained from official railway records and government reports.

Data Collection Methods :

a) Primary Data:

Descriptive study based on questionnaire survey among daily commuters

Desk research and interviews with railway officials and safety personnel

Inspection of crowding and safety measures and response facilities

The questionnaire included:

Travel frequency

Perception of safety

Experience of overcrowding

Awareness of safety measures

b) Secondary Data:

Reports from Central Railway and Western Railway on railway accident statistics

Notes: Ministry of Railways data; Government publications Researched articles and newspaper archives

Mumbai Urban Transport Project (MUTP) reports

6. Study Variables

Independent Variables:

Passenger density

Peak vs non-peak travel

Infrastructure facilities

Safety measures (CCTV, RPF presence, announcements)

Dependent Variables:

Accident rates

Passenger satisfaction

Perceived safety level

Public opinion (Backbone vs Burden)

7. Data Analysis :

Data was fed into Microsoft Excel and analyzed with SPSS software. Descriptive statistics like percentage, mean, and frequency distribution were calculated. Graphs and tables were used for presentation. Comparative analysis was carried out between safety and passenger perception.

8. Ethical Considerations :

Participation was voluntary. Informed consent was taken from the participants.

Personal identity of participants was kept confidential.

Data was used only for academic purposes.

9. Limitations of the Study :

Small sample size

Dependence on available accident data

Possibility of response bias in commuter surveys

Time-bound study

CHAPTER 5

CONCLUSION AND PREVENTIVE MEASURES :

In our study most of the railway deaths were males of younger age group and manner of death was accidental in nature most commonly during the evening hours.

Most of the railway deaths were due to hit by train while crossing the railway tracks and cause of death was due to intracranial hemorrhage as a result of head injury. Majority of deaths were brought dead to KEM Hospital and it was noted that only in 20% cases ambulance services were provided by railways.

Parel to Currey road station was the common station involve in railway accidents in our study.

The railways should take steps for improving the rail-safety to prevent accidents, such as:

1. A boundary wall on both sides of the track wherever possible would be erected and existing wall be repaired
2. Fencing should be done around the rail track and between the two railway tracks, especially within city limits to prevent suicides having easy access to it.
3. The railways must build sufficiently broad and strong foot-bridges/subways for crossing the tracks and also close the crossing points, frequented by the pedestrians for crossing the tracks with fencing, etc
4. Removal of some of the vertical poles close to the tracks.
5. Reduction
of the distance between
compartments and platforms, by raising the height of the platforms up to 840 mm, the maximum limit.
6. Improvement and updating of the signal system, increasing the number of rakes to increase capacity, adding more tracks increase capacity and speed up traffic. Effective ways to avoid accidents for the citizens are: self-vigilance, adherence to the rules/regulations and following safe practices.

CHAPTER 6

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FIG. 1 : TOTAL NUMBER OF RAILWAY DEATHS ACCORDING TO AGE GROUP AND SEX

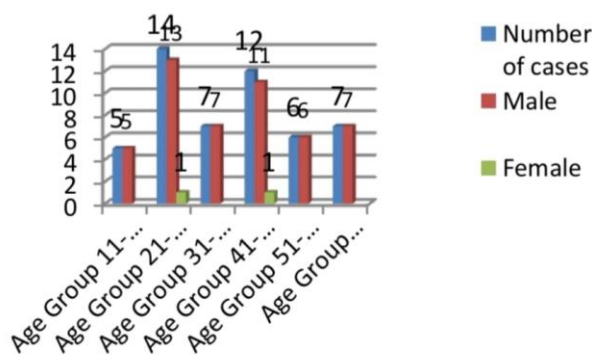


FIG. 2 : TIME OF INCIDENCE

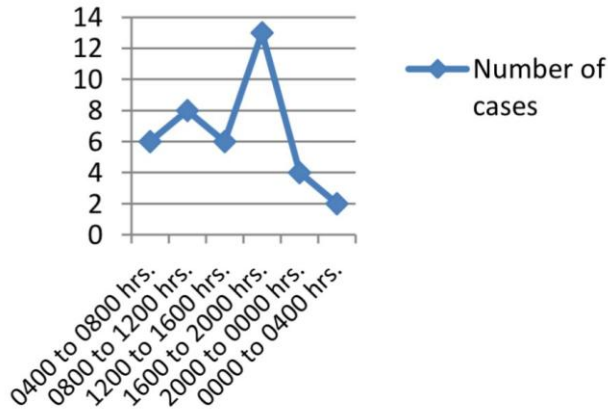


FIG. 3: MANNER OF DEATH IN RAILWAY DEATHS

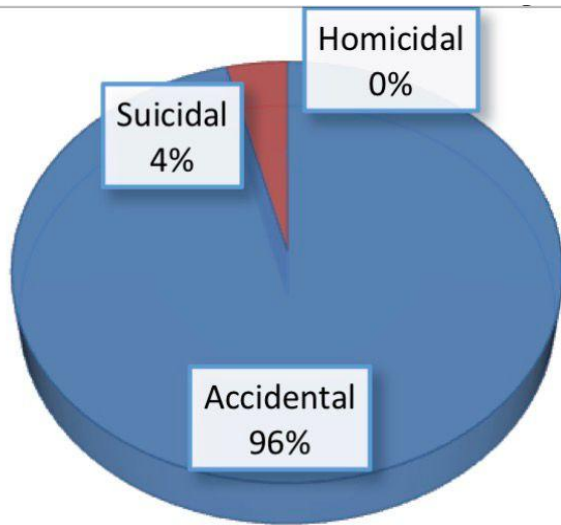


FIG. 4 : AVAILABILITY OF AMBULANCE AFTER THE INCIDENCE

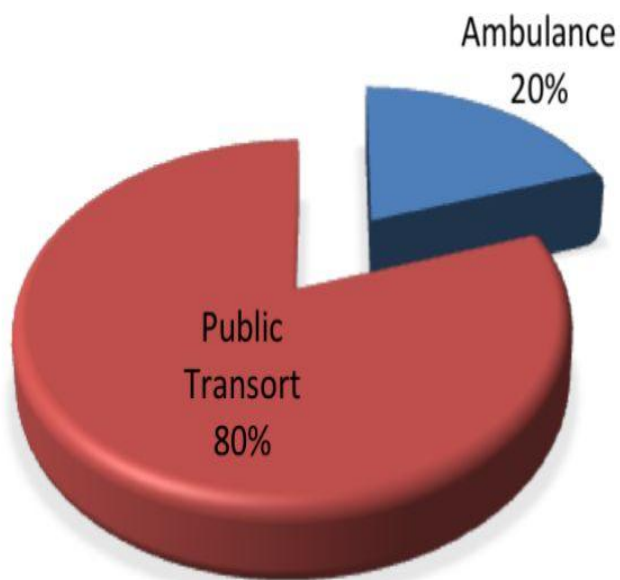


FIG. 5 : DISTRIBUTION OF RAILWAY DEATHS AT VARIOUS RAILWAY STATIONS

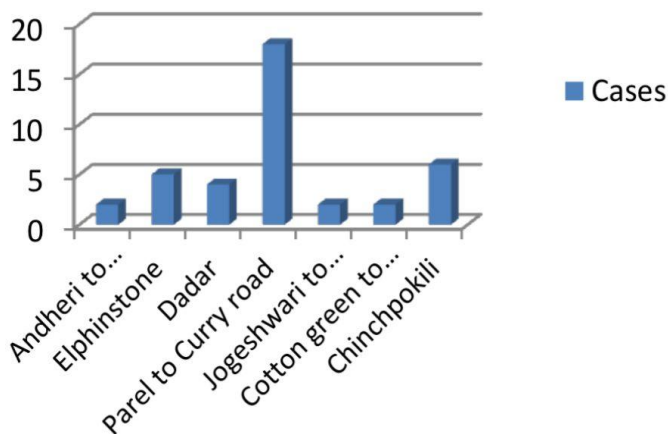


Table 1: Survival Period of Railway Deaths

Victims	Cases	%
Brought Dead	27	52.94
Survived less than 6 hrs.	03	05.88
Survived more than 24 hrs.	21	41.17

Table 2: Reason behind the Incidence of Railway Deaths

Reason behind the incidence	Cases	%
Hit by train while crossing track	26	50.9
Fall from running train	18	35.29
Hit by Pole	03	5.88
Falling through gap between platform and train	03	5.88
Electric shock over head wire	01	1.96

Table 3: Causes of Railway Death

Cause of Death	Cases	%
Intracranial Hemorrhage (Head Injury)	24	47.05
Shock and Hemorrhage (Due to blunt trauma)	18	35.29
Injury to Lungs (Due to blunt trauma)	05	09.80
Septicemia (Due to blunt trauma)	02	03.92
Pneumonia (Due to blunt trauma)	02	03.92