

# Retrospective Study on Railway-Related Deaths in South India

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## Abstract

**Background:** Railways form an important mode of transportation worldwide. People in India use the railway as an important means of transport as it is economical and easily available both for local service and for distant modes of transportation. Along with the advantages that railways are providing as a mode of transport, railway deaths are one of the important fatal outcomes in this part of the world. **Aim of the work:** To study railway-related deaths concerning age, sex, pattern of injuries, and causes of death. **Methods:** In the current study done in Bangalore, India, the autopsy and police records were scrutinized to collect information to obtain an overview of deaths occurring due to railway injuries and deaths occurring in trains. The study analyses several demographic factorial details and common regions of the body that are involved in railway-related deaths. **Results:** Apart from the common injuries encountered in railway-related deaths causing death, this study also gives information about type V of railway-related deaths (Unusual incidents). **Conclusion:** The railway-related deaths encountered include both natural and unnatural causes. **Recommendation:** Strict rules and regulations should be initiated along with safety measures from lawmakers to avoid accidents as well as suicides due to railway deaths, as the injuries sustained will be fatal in most cases.

## Key words

Transportation, Railway Deaths, Railway-related deaths, Patterns of injuries

## Introduction

Railway-related deaths are encountered among transportation-related deaths. Railway Board letter (2000), India states that the accidents occurring on railways are classified as - I. Train Accidents, II- Yard Accidents, III- Indicative Accidents, IV- Equipment failures, V – Unusual incidents. The unusual incidents refer to deaths/injuries resulting in law-and-order issues, like deaths due to various natural causes and other unnatural causes like suicides and animal accidents e.g: snake bites in trains. Murthy OP and Reddy KSN (2017) observed that the pattern of injuries varies according to the position of the victim on a railway track, the direction of motion of the vehicle, and the movement of the victim, whether towards the train or away from the train. A common manner in most railway-related deaths is accidental followed by suicide then homicide. Though the homicidal manner of death is rarely encountered during autopsy, difficulties do exist in the interpretation of injuries, as there may be super-added railways-related injuries. Apurba, (2016) has mentioned that determination of manner will be further made difficult in railway accidents due to a high degree of mutilation. A detailed analysis regarding the pattern of injuries will help us in solving problems associated with determining the manner. Identification of victims will be difficult in railway accidents, which is essential for

compensation, succession of property, and other viewpoints as well.

## Aim of the Work

1. To study the pattern of fatal railway accidents of sex and age
2. To study the most common parts of the body involved.
3. To get knowledge of other types of deaths occurring in the trains, other than railway-related injuries.

## Methods

The study was conducted in a tertiary care hospital, in Bangalore, India. It was a retrospective study conducted in the year 2016 on 216 railway-related deaths out of a total of 1210 deaths. Data was collected from autopsy reports and police information forms as per a pre-prepared proforma. A descriptive analysis of the data collected was done and discussed. Official approval was taken before using the data. The data confidentiality was maintained.

### Inclusion criteria:

All cases of railway-related deaths (deaths due to railway injuries and deaths occurring in the trains which come under the ambit of the railway police).

**Exclusion Criteria:** Cases other than railway-related deaths

## Results

Eighteen percent of total autopsies were railway-related deaths. As already stated, 216 cases were railway-related deaths out of 1210 total number of deaths autopsied.

On considering age groups involved, the number of deaths was higher among 21 to 30 years, with 70 cases; followed by 61 years and above which constituted about 36 cases. The youngest case was an 8-month-old female child, and the oldest case was 80 years old male and female. (Table 1)

Males were more injured than females accounting for 189 out of 216 cases (87.5%). (Figure 1). The identity of 128 individuals was known and 88 cases were unknown.

The most common region involved in railway accidents was head and neck in 167 cases, followed by the thoracoabdominal region which constituted 109 cases (Figure 2).

Lacerations were the most common external injury seen in 216 cases, followed by abrasions in 201 cases, contusion in 119 cases, and decapitation in 14 cases (Figure 3). Among internal organs, the most injured organ was the brain (89%), followed by

thoracoabdominal organs (69%) (Table 2). There were 77 cases where the brain was only involved with subdural and subarachnoid hemorrhages.

Skull fractures were seen in 117 cases followed by fractures of ribs in 34 cases, fractures of vertebrae in 33 cases, pelvic bone fractures in 11 cases, and fractures of long bones in 71 cases. Among skull fractures, comminuted fractures were common, in 66 cases (Figure 4).

The study showed the causes of death in 112 cases were given as injuries sustained, followed by Head injury sustained in 39 cases including crush injuries of the head and face, and 25 cases were concluded as shock and hemorrhage. 14 cases were concluded as instantaneous deaths related to railway injuries. 15 deaths were due to natural disease and 5 cases were due to other unnatural deaths, so a total of 20 cases were Category V of railway-related deaths. Among the deaths occurring in trains, 15 cases of natural deaths and 5 cases of unnatural deaths were observed. Among the natural deaths, 9 deaths were that of lung infection, 5 cases were due to cardiac arrest and 1 case had liver disease. The unnatural causes were 1 case each of snake bite in the compartment, homicide with a stab injury, suspected homicide (transected body with ligature mark), hanging in the railway compartment, and fall from height (Figure 5).

**Table 1: Frequency distribution of railway deaths among different age groups (number =216)**

Age Group	Number of Cases	% of Cases
0 to 10 Years	1	0.47
11 to 20 Years	21	9.72
21 to 30 Years	70	32.40
31 to 40 Years	35	16.20
41 to 50 Years	30	13.88
51 to 60 Years	23	10.64
61 years & above	36	16.66
Total	216	100

**Table 2: Frequency distribution of Involvement of internal organs among railway-related deaths. (number=216)**

Internal Organs	Number of Cases	% of Cases
Brain	194/216	89
Lungs & Heart	90/216	41
Abdominopelvic	61/216	28

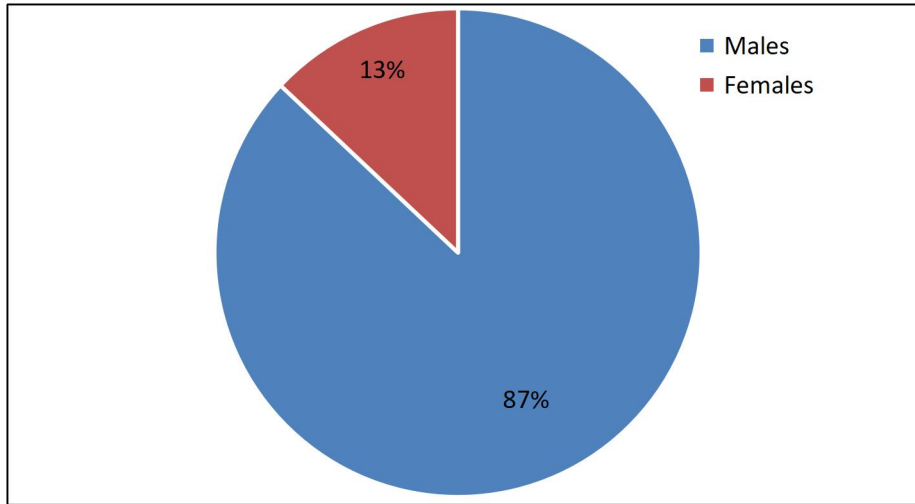


Figure 1: Sex distribution in railway-related deaths encountered in the study

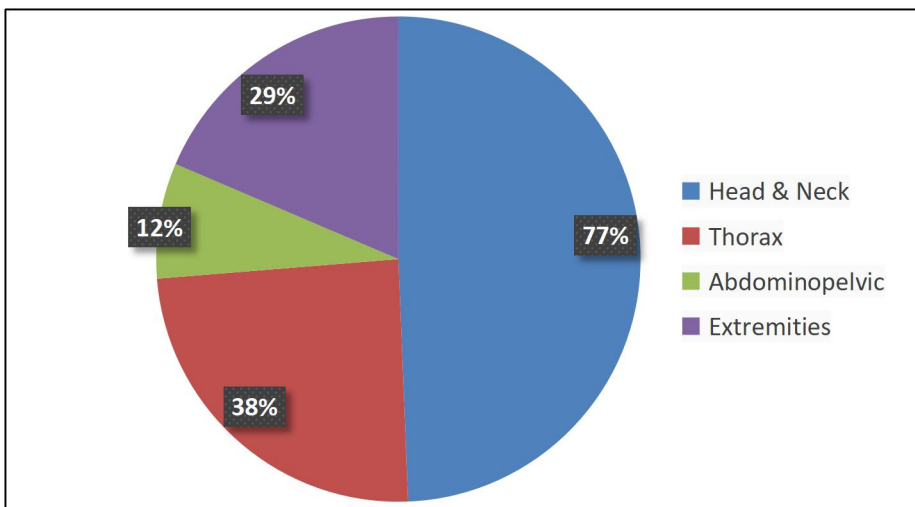


Figure 2: Regions of the body involved in railway-related deaths

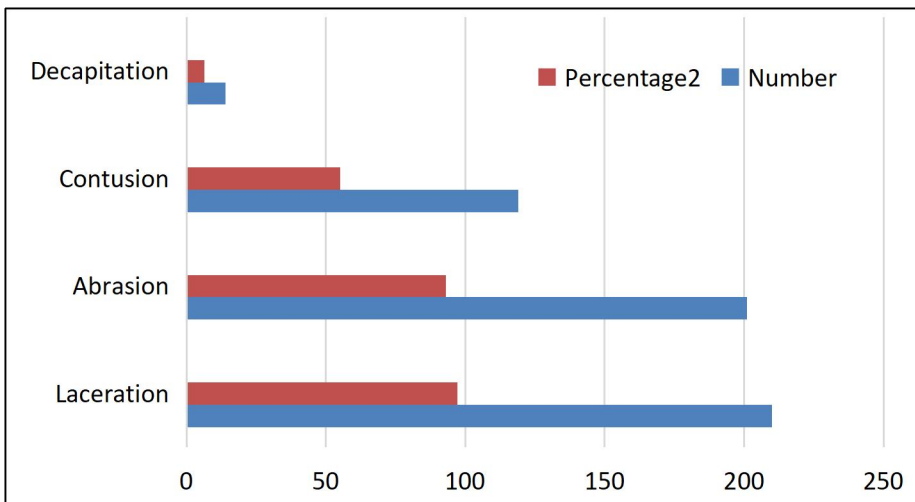


Figure 3: Distribution of Pattern of External Injuries among railway-related deaths

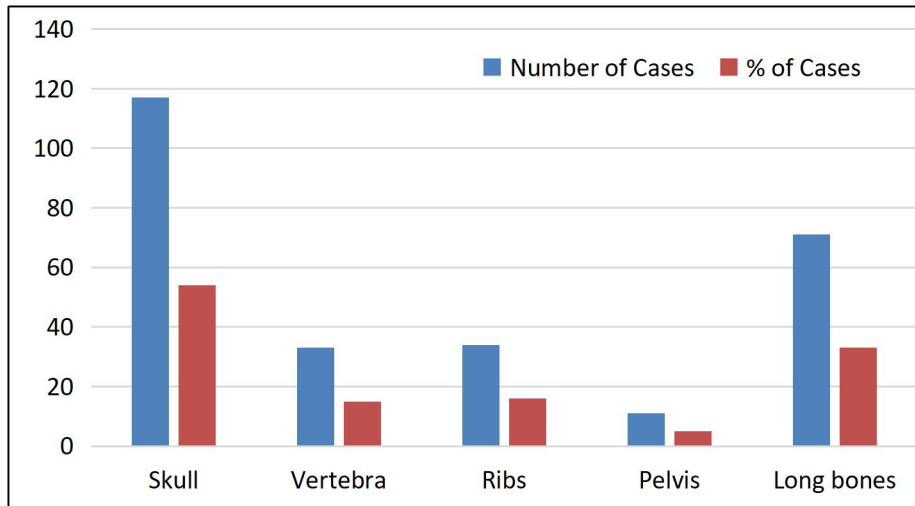


Figure 4: Distribution of region-wise fractures involved among railway-related deaths

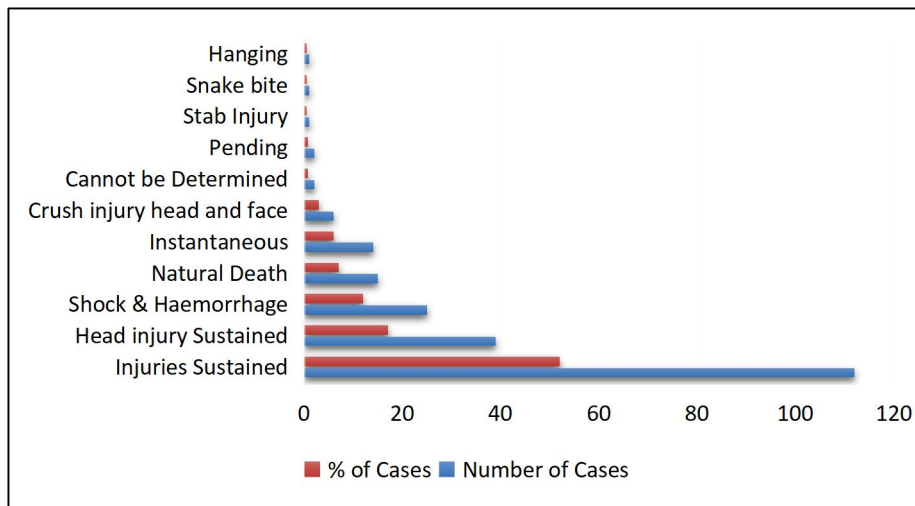


Figure 5: Distribution of causes of death obtained from the study among railway-related deaths.

**Discussion**

In the current study, railway death constituted 18% of total autopsies, which is like the study done in Kerala, by Valsala et al., (2017), but a little higher in another study done in Surat, Gujarat, India by Sheik et al., (2008) where 26% of cases were due to railway deaths. The difference may be due to the variation in the number of railway deaths that were brought for the autopsy to the institution.

The higher incidence of males could be due to more outdoor activities and transportation used by males. The study is like the study done by Mohanty et al., (2007).

The incidence in the current study was common among age groups belonging to the 3rd decade followed by the 6th decade and above. A similar finding was observed by Puttaswamy, (2015) in a town in the south of India, which may be due to more outdoor activities in this age group, but the study contrasts with the study done by Valsala et al., (2017) where the incidence was common among 6th decade and above.

The identity of 88 individuals was not known, due to migrating population involvement or a high degree of mutilation of the body. This was also discussed by Apurba, (2016).

The region most involved was the head and neck followed by the thoracoabdominal region which is like a study done by Hari et al., (2016) where head injuries were common, but contrast to another study in Kolkata where multiple injuries to multiple regions were common.9 In another study done in Nagpur by Ramesh, (2010), crush injuries to limbs were common followed by head injuries.

The most common external injuries that were noticed were lacerations followed by abrasions. The study is like a study done in Kolkata where lacerations were common followed by fractures. The current study revealed decapitation in only 14 cases whereas, Puttaswamy, (2015) observed decapitation followed by hemi section of the body was common among suicides. Neck involvement in the current study was seen in 14 cases which contrasts with a study done in Moradabad by Afzal and Ravi, (2016)

In the current study cause of death opined by the autopsy surgeons was due to an injury sustained, followed by shock and hemorrhage, which contrasted with a study done by Mangesh and Dinesh, (2017) and Meena et al., (2017) where shock and hemorrhage was given as the common cause.

Ibrahim et al., (2021) in a retrospective study conducted in the coastal region of the same state as the current study observed a lesser number of railway-related deaths in a year, with an age distribution between 31-39 years, more involving head followed by limb injuries. They documented more limb injuries in suicidal deaths compared to head injuries in the accidental type. In the current study, we noted category V railway-related deaths which were not seen in most of the studies.

## Conclusion

Railway deaths were common in this region of India (Bangalore), as railways form one of the important modes of transport. Railway tracks without proper fencing are close to living areas in some parts of Bangalore, where the trespassers will be accidentally involved in sustaining railway injuries in most cases. This study observes that railway-related deaths include deaths occurring due to natural and unnatural causes.

## Recommendations

Strict rules and regulations should be initiated along with safety measures from lawmakers to avoid accidents as well as suicides due to railway deaths, as the injuries sustained will be fatal in most cases. Quick and better emergency services of health providers can avoid some of the deaths due to natural diseases and some of the non-fatal injuries sustained on the railway station premises. It is advisable to have an emergency response medical team constantly present in a train during a journey to prevent many such deaths related to railways.

## Limitations of the study

- Being a retrospective study, it influences the data presentation.
- Information regarding the manner of deaths in all the deaths due to injuries sustained is lacking; which might affect the opinion of the readers on whether a particular death was due to suicide or accidental or homicidal in nature.
- Data on the individuals who survived railway-related accidents is lacking in this study.
- No much data is available in the other category (II to V) railway-related deaths in the form of autopsy studies.
- In a countable number of cases, the cause of death is opined as instantaneous, and some were kept pending. Details regarding the same cannot be obtained. This further adds to the limitation of the data on causes of death in this study.

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## دراسة إسترجاعية عن الوفيات المرتبطة بالسكك الحديدية في جنوب الهند

### الملخص العربي

**الخلفية:** تشكل السكك الحديدية وسيلة نقل هامة في جميع أنحاء العالم. يستخدم الناس في الهند السكك الحديدية كوسيلة نقل مهمة لأنها اقتصادية ومتاحة بسهولة للخدمة المحلية ولوسائل النقل البعيدة. إلى جانب المزايا التي توفرها السكك الحديدية كوسيلة من وسائل النقل، تعد الوفيات الناجمة عن السكك الحديدية إحدى النتائج المميّزة المهمة في هذا الجزء من العالم.

**الهدف من العمل:** معرفة الوفيات المرتبطة بالسكك الحديدية من حيث العمر والجنس ونمط الإصابات وأسباب الوفاة.

**الطرق:** في الدراسة الحالية، تم فحص سجلات التشريح والشرطة لجمع المعلومات للحصول على لمحة عامة عن الوفيات التي تحدث بسبب إصابات السكك الحديدية والوفيات التي تحدث في القطارات. تحلل الدراسة العديد من التفاصيل الديموغرافية والمناطق المشتركة في الجسم التي تشارك في الوفيات المرتبطة بالسكك الحديدية.

**النتائج:** تقدم هذه الدراسة معلومات حول الحوادث غير العادية التي تحدث في القطارات وعن الأسباب المختلفة للوفيات المرتبطة بالسكك الحديدية.

**الاستنتاج:** تشمل الوفيات المرتبطة بالسكك الحديدية أسبابًا طبيعية وغير طبيعية. **التوصيات:** ينبغي وضع قواعد وأنظمة صارمة إلى جانب اتخاذ تدابير السلامة من قبل المشرعين لتجنب الحوادث وكذلك حالات الانتحار بسبب وفيات السكك الحديدية، حيث أن الإصابات التي لحقت ستكون قاتلة في معظم الحالات.