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Profile of Deaths Due to Railway Injuries Autopsied at Tertiary Care Center

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Abstract

Background: This study was carried out on 53 railway related deaths in order to determine the specific pattern and distribution of wounds. Of the 53victims,79.5% were males and 20.5% were females. The majority were in the age group of 21-40 years. Most of the victims died as the result of an accident (80.7%). Of the 17 suicide cases, ten deaths occurred during the night. In 71 railway accident deaths, 64.8% of victims were pedestrians; thirty-five victims were illiterate and two had consumed alcohol. Decapitation wounds were more common in suicidal deaths and the head was the body region most commonly involved in railway accidents. Our results indicate that railway related deaths could be prevented by surveillance, education and public awareness.

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Introduction

In India, railway related deaths are quite common. India has one of the largest railway networks in the world and accidents are not unexpected. In a few cases a determined suicide victim will deliberately lie across the railway tracks or even place his/her head so that self-destruction is inevitable (Vij, 2005). In the absence of a case history, it can be difficult to distinguish between death due to crossing a track, suicide, or criminal violence (Lerer et al., 1997). Death associated with railways mostly occurs when a person attempts to cross the as a convenient route for walking. Other reasons for death may be a train and automobile accident, a collision between trains, or passengers hanging out of compartment doors who are hit by posts, trees or electrical poles. Trauma related to railway accident victims is usually severe, instantly fatal and extremely mutilating. Certain features such as wheel marks on the body,dirt and grease contamination and the manner of severance of tissues deserve special observation to rule out criminal violence. The present study has been carried out to establish the pattern, epidemiological features and other significant findings in cases of railway related death.

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Materials And Methods

In 963 autopsies, 53 cases(5.5%)were railway related deaths, which form the cohort of the present study. All autopsies were performed during a 8 months period from July 2022 to February 2023 in the department of Forensic Medicine of Chengalpattu government Medical College, which is a tertiary care teaching hospital in Tamilnadu state, South India.

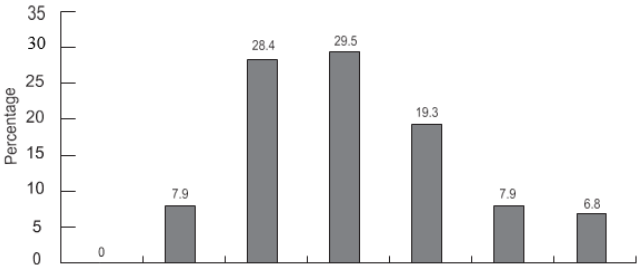

Figure 1: Age distribution of the victims.

Each railway death case was evaluated prospectively at post-mortem examination for the injuries present on the body. Simultaneously, information regarding the age and sex of the victim, time of occurrence, and manner of death was collected from the police records, hospital records, eye-witnesses (if any) and from the relatives accompanying the corpse. A thorough post-mortem examination was carried out on all cases of railway related death and in a few cases viscera was sent to a forensic science laboratory to rule out poisoning. All data was collected in a Proforma and findings were put in tabular form and analyzed. All cases where a train was not involved in the cause of death were excluded from the study.

Results

During the 8 months period (2022-2023), from a total of 963 post-mortem cases which came to the mortuary, 53 were victims of railway related death.The overwhelming majority of victims were male(70)and18werefemale,giving a male to female ratio of 3.9:1. Most of them were in the age group 21-40 years (Figure 1). The ages of the victims ranged from 11 to 76years.

There were no cases of homicide, and most of the deaths were accidental (80.7%). The accident cases occurred almost equally between day and night but suicide cases occurred predominantly at night (Table I).

Excluding suicide-related railway death, most of the accident victims were pedestrians who were trespassing on railway property (Table II). There was a slight preponderance of illiterate victims (Figure 2). Only two cases (2.3%) showed ethanol in the blood of the victims.

Thirteen out of 17 suicide cases showed a decapitation wound over the neck, with or without associated fatal injuries. In61(85.9%) cases of accidental death, a fatal injury was present on the head (Table III).

Table I

Pedestrians	34	64.8
Slipped from train	10	19.7
Railway employee	4	8.4
Vehicle/train collision	1	2.8
Unknown	3	4.2

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Table II: Categories of victims in railway accidents.

Time	Accident	Suicide	Total
Day	23	3	26
Night	18	5	23
Not known	2	2	4
Total	43	10	53

Table III: Distribution of fatal wounds

	Number of cases		
Body part involved	**Accident**	**Suicide**	***Total (%) (N=88)**
Head	54	7	61 (69.3)
Neck	12	13	25 (28.4)
Thorax	16	1	17 (19.3)
Abdomen	20	3	23 (26.1)
Upper extremities	15	4	19 (21.6)
Lower extremities	21	1	22 (25.0)

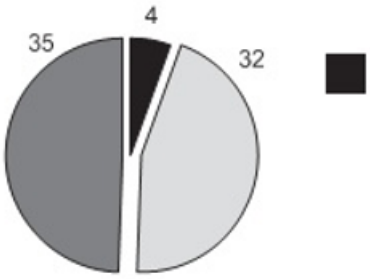

Figure 2: Literacy status of the victims

Discussion

Deaths have occurred in association with railways since the beginning of the railway industry (Davis et al.,1997). Trains are connected with the progress of the nation and have become part of the daily life of the people. In the present study, males are the commonest victims of railway related death which is supported by other authors (Cinaetal., 1994; Schmidtke, 1994; Pelletier,1997; Davis et al., 1997; LererandMatzopoulos,1997, Strauch et al., 1998). This indicates the preponderance of males in the moving population, who are therefore more often exposed too occupational hazards than females. The age group most commonly associated with rail way related death was between 21-40years; it occurs significantly less often in the extremes of age. This corresponds with other studies (China et al., 1994; LererandMatzopoulos,1997; Pelletier, 1997). Another study in Berlin (Strauch et al., 1998) reported that the majority of victims were aged between13-25years, and most of them between16-20years.It is most likely due to fact that this age group largely consists of students or working people in various places who travel by train.

The conclusions regarding the manner of death are based upon the history given by the police, the scene investigation and autopsy findings. Accidental deaths outnumbered suicides and there were no cases of homicide. Our findings were similar to a study in Charleston (Cina et al., 1994) in Jefferson County, Alabama (Davis et al., 1997), and in Cape Town, South Africa (Lerer and Matzopoulos, 1997). By contrast, another

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Total exceeds 100% because more than one body part involved per victim. study carried out in London (Cocks, 1987) shows deliberate self-harm was a probable cause of death in roughly three quarters of cases.

The time of deaths was almost equally distributed between day and night. But when considering suicide alone, it more commonly took place at night. A similar finding was observed by Pelletier(1997). Schmidtke(1994) observed that suicide incidents on railways mostly occurred in the evening, especially after sunset. It may be due to fact that the victim prefers to commit suicide in darkness, so that nobody can see and rescue him.

Amongst 53 victims, 49.2% cases were illiterate. In four cases the literacy status of the victims was unknown. A study by Pelletier (1997) reported that the majority of victims had not received a high school education.

Ethanol was detected only in two (2.8%) cases out of 53 accidents but a study in Delhi (RautjiandDogra,2004) reported the presence of alcohol in 17.4 cases. Our finding is also in contrast to the findings of other researchers (Shapiro et al., 1994; Cina et al., 1994; Lerer and Matzopoulos, 1996; Pelletier, 1997; Strauchetal.,1998).The fact that we observed fewer alcoholic victims compared with other studies may be due to growing awareness among the public regarding drinking alcohol and travelling along or crossing railway tracks. Another reason may be the strict action Against alcoholic drinkers by the government railway police. In 34 cases out of 53, the railway accident victims were pedestrians. A similar finding has also been expressed by other authors (Pelletier, 1997; Lerer and Matzopoulos, 1997; Davis et al, 1997; Goldberg et al., 1998). Pedestrian, here, includes any person trespassing, running, lying or sitting on the railway tracks. In a developing country like India the railway tracks are frequently used as pedestrian paths in the absence of bridges, subways and other suitable road crossings.

The present study also demonstrates people's disregard for personal safety. Of the 53 victims of an accident, 10 died from falling or slipping while boarding the train. This finding is consistent with a study in South Africa(LererandMatzopoulos,1997).Another six decedents were railway employees, who died while working. A study in Alabama(Davis et al., 1997) reported similar findings, but Spaite et al. (1988) and Agalar et al. (2000) in their studies found that in more than fifty per cent of cases, the victim died after falling onto the track or from a train. This is in contrast to the present study.

Amongst 10 suicide cases, 7 had a decapitation wound on the neck, with or without other injuries. In the railway accidents, most of the victims had fatal injuries over the head which correlates with the findings of others (Kejlaa, 1990; Lerer and Matzopoulos, 1997; Strauch et al., 1998). In many cases, fatal injuries mutilated the body and involved more than one body region. Cina et al. (1994) in their retrospective analysis of 34 consecutive train/pedestrian fatalities found the cause of death was massive blunt trauma in 88% of cases. This is explained by the fact that an enormous amount of kinetic energy is transferred to the body when a train strikes it. A study in Cape Town (Lerer and Matzo- poulos,1997) showed that fatal railway injuries are characterized by the disruption of more than one body region.

Conclusion

The present study highlights the following features regarding railway related deaths:

1.Males outnumbered females. Most of them were between 21 and 40 years of age.

2. Most of the victims died due to an accident. The majority were pedestrians.

3. The majority of cases of suicide occur at night.

4. Railway injuries are often extensive and present over more than one body region. The head is the most frequently involved part of the body.

In order to reduce the number of railway related deaths, preventive measures should be

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implemented such as improved integrated surveillance systems and safety engineering; reduced public access to railway tracks by security measures, and better lawen forcement at stations. Greater public awareness needs to be created by educating the public about the dangers of railway trespassing. These measures, together with improved railway design my help reduce the human and financial loss of train related deaths.

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