

Original Article

Deaths Due to Locomotive Injuries in Jaffna District- Eight-Year Retrospective Study Are We Prepared to Change Our Attitude?

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Abstract

Railway-related fatalities were rising and reported throughout the year. Reckless behavior and using the train as a suicide tool are the primary cause of these tragic deaths.

A retrospective descriptive study based on decedents of locomotive trauma was carried out at the JMO office, Jaffna, from January 2015 to January 2022.

Thirty decedents were included in this study. Among them, twenty-nine were male, and the age of the individuals ranged from 16 to 73 years. Fifty-seven percent (n=17) of them were between 20 to 40 years. Most were married (57%, n=17) and unemployed (57%, n=17). There were 20(67%) accidents, 09(30%) suicides, and manner could not be ascertained in one (03%) death. Among the accidental deaths, 60%(n=12) were due to vehicle-train collisions, and 80%(n=16) of the deaths occurred at railway crossings. Most (67%, n=06) of the suicidal deaths happened alongside the railway track, away from stations, or rail crossings. All the decedents in both accidents (100%, n=20) and suicides (100%, n=09) had lacerations over the head and neck area. Hundred percent (n=20) of accident cases sustained fractures of the head and neck, 33% (n=03) One (10%) case of decapitation was noted in the self-harmed group. Over the chest region, more than 50% of the deaths had fractures in both accidents (80%, n=16) and suicides (56%, n=05). One (10%) case of transection of the body at the level of the chest was seen in a suicide case. Transection of the body at the level of the abdomen was seen in the accident (05%, n=01) and suicide (10%, n=01). The distribution and nature of injuries were almost identical in both upper and lower limbs. The brain is the internal organ that is primarily affected in both accidents (90%, n=19) and suicides (78%, n=07). In eighty percent (n=24) of the cases cause of death has been determined as craniocerebral injuries, while in 20% (n=06) of the cases, multiple injuries were given as the cause of death.

The majority of railroad deaths were accidental. Transections of the neck and chest were commoner in suicides than in accidents. The nature of external injuries and internal organ damage were not showing a significant difference in accidents and suicides.

Keywords

Locomotive, Accident, Suicide, Cause of death, Manner of death

Introduction

The total population of Sri Lanka is constantly increasing with time. It was 14.8 million in 1981, 18.7 million in 2001, and 21.6 million in 2021.(1) The increasing population, sudden rise in vehicles, poor infrastructure, and the public's negative attitude are the main contributing factors to the growing number of transportation deaths.(2) Among this, railway-related fatalities are also rising and are reported throughout the year. Sri Lanka railway consists of 1567 kilometers of rail tract with 360 railway stations. At the same time, they have operated 396 trains per day and carry 3.72 million people daily. According to recent statistics, around two hundred and fifty people die annually from railway-related deaths.(3)

A few studies have been done regarding railway-related deaths in Sri Lanka. Still, the general understanding is that most deaths do not occur due to the fault of the train or rail tract, such as signal failure, derailment, and mechanical defects in the train. But the reckless behavior of the public or using it for suicides is the primary cause of these tragic deaths. Fatalities are rarely reported among train passengers and railway department workers while on duty. Unguarded level crossings are vulnerable to pedestrian-train, and vehicle-train collisions as these are the common places where people cross the tracts carelessly without noticing the signals or using mobile phones.(4)

In contrast to other modes of transportation trauma, locomotive injuries are very severe due to the train's high momentum (weight x speed). We have witnessed

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extensive musculoskeletal and visceral injuries following locomotive trauma, including decapitation, degloving injuries, and severe mutilation of the face and the body.

This study analyzed socio-demographic factors, injury patterns, distribution, cause of death, and incident circumstances. The author sincerely hopes that this study will help to create awareness among the readers about recognizing the injury pattern and trends in locomotive fatalities.

Methodology

A retrospective descriptive study based on decedents of locomotive trauma was carried out on all the cases reported in post-mortem reports examined at the JMO office, Jaffna, from January 2015 to January 2022. The study sample was convenient sampling. Data were collected from the post-mortem reports and relevant documents. The extracted data were analyzed using SPSS statistical package version 26.

Results

Thirty decedents were included in this study. Twenty-nine (97%) were males, and one (03%) was female. The age of the decedent ranges from 16 to 73 years. Among them, 57%(n=17) were between twenty and forty years. Majority of them (57%, n=17) were unmarried while 40%(n=12) were married. Considering the occupation, most (57%, n=17) of them were unemployed, 33%(n=10) were employed, and two (07%) of them were students. Socio-demographic factors are shown in table 1.

Table 1: Sociodemographic factors

	Frequency	Percentage (%)
Sex		
Male	29	97
Female	1	03
Age		
<20	2	07
20-40	17	57
41-60	8	26
>60	3	10
Marital status		
Married	12	40
Unmarried	17	57
Unknown	1	03
Occupation		
Student	2	07
Unemployed	17	57
Employed	10	33
Unknown	1	03

There were 20(67%) accidental fatalities, 09(30%) suicidal fatalities, and one (03%) death; the manner of death could not be ascertained in this study. The manner of death is shown in Figure 1.

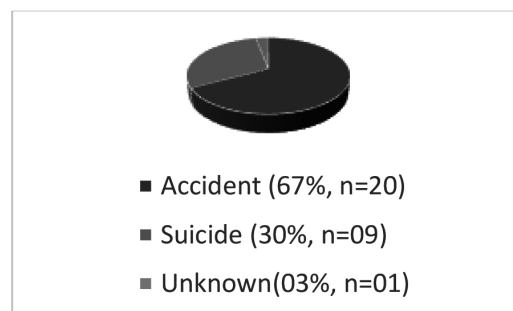


Figure 1: Circumstances of death.

Among the accidents, twelve (60%) deaths were due to vehicle-train collisions. Sixteen (80%) have occurred at the railway crossing, and one (05%) death was due to a fall from the train. Three (10%) individuals had hearing defects, and 07% (n=02) were suffering from psychiatric illness and wandering streets. At the same time, 15%(n=3) of the decedents were under the influence of alcohol during the accident.

Most (67%, n=06) of the suicidal deaths occurred alongside the rail tracts away from the stations or railway crossings, while 33%(n=03) occurred near the railway crossings.

Due to the high momentum of the train, the injuries sustained were also very severe. Twenty-eight (93%) of the victims succumbed before reaching the hospital. Twenty-nine (97%) decedents were positively identified, and one (03%) death was recorded as unidentified. Most (73%, n=22) deaths occurred between 12 noon and 08 pm. The highest number of deaths happened in the Chavakachcheri (23%, n=07) area, followed by the Ariyalai (20%, n=06) area. Locations of the incident are shown in Table 2.

Table 2: Location of Incident

Location	Frequency	Percentage (%)
Kankesanthurai	01	03
Chunnakam	03	10
Inuvil	01	03
Kondavil	04	14
Kokuvil	01	03
Jaffna	04	14
Ariyalai	06	20
Chavakachcheri	07	23
Kodikamam	03	10
Total	30	100.0

All the decedents in both accidents (100%, n=20) and suicides (100%, n=09) had lacerations over the head and neck area. Hundred percent (n=20) of accident cases sustained fractures of the head and neck, while 33% (n=03) in suicides. One (10%) case of decapitation was noted in the self-harmed group. The nature of the injury in the head and neck is shown in Table: 3.

Table 3: Nature of Injuries in the Head and Neck area.

Nature of Injury	Number of Accidents(n=20)	Number of Suicides(n=09)
Abrasion	13(65%)	05(56%)
Contusion	03(15%)	00(00%)
Laceration	20(100%)	09(100%)
Fracture	20(100%)	03(33%)
Mutilation	04(20%)	01(10%)
Decapitation	00(00%)	01(10%)

Over the chest region, more than 50% of the deaths had fractures in both accidents (80%, n=16) and suicides (56%, n=05). One (10%) case of transection of the body at the level of the chest was seen in a suicide case. The number of cases of abdominal injuries was less in accidents and suicides. Transection of the body at the level of the abdomen was seen in the accident (05%, n=01) and suicide (10%, n=01). The distribution and nature of injuries were almost identical in both upper and lower limbs. The distribution and nature of injuries in the chest, abdomen, upper limbs, and lower limbs are shown in Table: 04, Table 05, Table: 06, and Table 07, respectively.

Table 4: Nature of injuries in Chest

Nature of Injury	Number of Accidents(n=20)	Number of Suicides(n=09)
Abrasion	06(30%)	04(44%)
Contusion	02(10%)	01(10%)
Laceration	07(40%)	01(10%)
Fracture	16(80%)	05(56%)
Transection	00(00%)	01(10%)

Table 5: Nature of injuries in the Abdomen

Nature of the Injury	Number of Accidents(n=20)	Number of Suicides(n=09)
Abrasion	06(30%)	02(22%)
Contusion	01(05%)	00(00%)
Laceration	03(15%)	00(00%)
Transection	01(05%)	01(10%)

Table 6: Nature of the injuries in the Upper limbs

Nature of the Injury	Number of the Accidents(n=20)	Number of the Suicides(n=09)
Abrasion	06(30%)	01(11%)

Contusion	00(00%)	00(00%)
Laceration	18(90%)	03(33%)
Fracture	16(80%)	05(56%)
Traumatic amputation	06(30%)	02(22%)

Table 7: nature of the injuries in the Lower limbs

Nature of the Injury	Number of the Accidents(n=20)	Number of the Suicides(n=09)
Abrasion	06(30%)	05(56%)
Contusion	01(05%)	00(00%)
Laceration	11(55%)	05(56%)
Fracture	10(50%)	05(56%)
Traumatic amputation	05(25%)	03(33%)

The brain is the internal organ that is primarily affected in both accidents (90%, n=19) and suicides (78%, n=07). Next to the brain, the lungs were more affected. Internal organs involvement is shown in Table: 8

In eighty percent (n=24) of the cases cause of death has been determined as craniocerebral injuries, while in 20% (n=06) of the cases, multiple injuries were given as the cause of death.

Table 8: Internal organ involvement

Internal Organs	Number of the Accidents(n=20)	Number of the Suicides(n=09)
Brain	19(90%)	07(78%)
Heart	02(10%)	00(00%)
Lungs	14(70%)	05(56%)
Liver	07(35%)	03(33%)
Spleen	08(40%)	01(11%)
Kidney	03(15%)	01(11%)

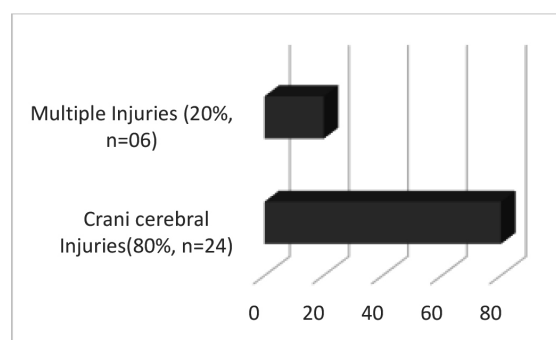


Figure 2: Cause of death of the decedents.

Discussion

The history of the incident is paramount important in the medicolegal investigation. History can be obtained from an eyewitness, guard, train driver, or the police. Though the driver is a very suitable person to get reliable history, in routine practice, history is given by the relatives and police.

Unless witnessed fatalities, railway death should be investigated as homicides until proven otherwise. To determine the manner of death, corroborating the injury pattern with the given history is essential and should be done with great caution. In some cases, establishing the decedent's identity is challenging, as in mutilated bodies.

Extensive external and internal examination, injury interpretation, and event reconstruction would resolve most medico-legal issues.

Researches regarding railway fatalities in Sri Lanka are necessary to get a better understanding to determine the circumstances.

In the present study, 97%(n=29) were male, and most were between 20 to 40 years old. Young males are commonly victimized in these tragic deaths. Several other studies in different parts of the world also reinforced this fact (5, 6, 7). Alcoholism, other types of substance abuse, using mobile phones while driving, and violating the safety measures such as crossing the railway line while signals were on are the major contributing factors to the deaths of the youths (4).

Most of the deaths, including accidents and suicides, occurred between 12 noon to 8 pm. In the Jaffna peninsula, most trains operate in the afternoon and evening. This may be the reason for this observation. Intercity train running in the afternoon is mainly involved in these incidents as the speed of these trains is very high. At the same time, the visibility of the Jaffna railway crossings is compromised due to curved roads, buildings adjacent to the crossing, and poor illumination. A study in the United States reveals that the train's speed is the critical factor contributing to this fatality (8).

The current study shows that accidents(n=20) are more common than suicides(n=09). But a study by Lin et al. conducted in New York, USA, stated that suicides are more common than accidents (9). Strict regulations and discipline in Western countries may be the reason for reducing railway accidents. The reason that people choose trains to end their lives is not understood correctly as the scarcity of studies related to railway fatalities. But the severity of injuries and instantaneous

death following a hit by a train could be the reason for choosing this method as a suicidal tool.

In this study, head and neck injuries were seen in all decedents. Lacerations and fractures were more common in both accidents and suicides. Decapitation was only observed in suicidal deaths. Usually, they keep their head on the track to be run over by the train. Therefore, minimum injuries will be noted in the other parts of the body (10). Transection of the body at the level of the chest was also only noted in suicidal deaths, while multiple injuries were comparatively more in accidental deaths. Other studies also stated that the transection of the body is typical for suicides. Here individuals lie across the railway track to commit suicide (7),(9). Transection of the body at the level abdomen was noted once each in accident and suicide. In the accident case, a pillion rider of a motorbike was ejected due to the impact and landed on the track. Then he was run over by the train. Transection of the body at the level of the chest and abdomen is often associated with traumatic amputation of the limbs due to the relative positions of the limbs during the incident.

In this study, the brain is the internal organ injured primarily in accidents and suicides. Lungs are also significantly affected. But there was no difference in internal organ injuries in accidents and suicides. Decapitation and transection of bodies are more suggestive of suicide. Some of the overseas studies also show similar observations.(6,7,9,10)

In railway fatalities, the circumstances of the death are more crucial than finding the cause of death. Detailed history, extensive external and internal examination, interpretation of injuries, and reconstruction of events are the key to establishing the manner of death (4).

The common cause of death in this present study was craniocerebral injuries (80%). Most of the decedents had multiple injuries, but only 20% of them were given multiple injuries as the cause of death. locomotive trauma is commonly severe, especially head injuries that are rapidly fatal; sometimes, it can cause instantaneous death. Due to this reason, craniocerebral injuries were given as the cause of death.

Conclusion

The majority of railroad deaths were accidental. Transections of the neck and chest were more common

in suicides than in accidents. The nature of external injuries and internal organ damage were not showing a significant difference in accidents and suicides.

Recommendations

Public awareness is the key to reducing railway fatalities. Strict enforcement of the law and implementation of effective protective mechanisms will significantly contribute to preventing these tragic deaths. Psycho-social support of vulnerable people and rehabilitation could help to reduce suicidal fatalities related to the locomotive, and it will help to control the suicidal deaths in society also.

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Declaration of Conflicting Interests

The author declared no potential conflicts of interest concerning the research, authorship, and publication of this article.

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