

## Epidemiological Approach to Mortal Lesions-Traffic Accident in Yara Municipality, 2007, Cuba

Blanco VMP<sup>1</sup>, Socarrás AER<sup>2</sup>, Abal GCP<sup>3</sup>, Blanco MP<sup>4</sup> and Peña GCA<sup>5</sup>

<sup>1</sup>National Institute of Neurology and Neurosurgery, Havana, Cuba

<sup>2</sup>Service of Endoscopic Surgery in Clinical-Surgical Hospital Celia Sanchez Manduley, Manzanillo, Granma, Cuba

<sup>3</sup>Department of Neurosurgery, Havana, Cuba

<sup>4</sup>Clinical Surgical Hospital Celia Sanchez Manduley, Manzanillo, Granma, Cuba

<sup>5</sup>Community Infirmary, Polyclinic Marcio Manduley, Havana, Cuba

\*Corresponding author: Blanco VMP, National Institute of Neurology and Neurosurgery, Havana, Cuba, Tel: (53) 55570374, E-mail: vmanuelpb@infomed.sld.cu

**Citation:** Blanco VMP, Socarrás AER, Abal GCP, Blanco MP, Peña GCA (2019) Epidemiological Approach to Mortal Lesions- Traffic Accident in Yara Municipality, 2007, Cuba. *J Neurol Neurol Disord* 5(1): 103. doi: 10.15744/2454-4981.5.103

**Received Date:** August 28, 2019 **Accepted Date:** December 17, 2019 **Published Date:** December 19, 2019

### Abstract

The purpose of this article is to describe the epidemiological behavior of the mortal lesions in a traffic accident occurred in Yara, Municipality, Cuba, in 2007. Method: The clinical, radiological and anatomical-pathological variables of mortal lesions in the traffic accident as a result of the collision between a train and a bus in Veguitas town, in Yara, municipality of Granma province, on October 6<sup>th</sup>, 2007. They were obtained from the clinical records by means of a statistical and non-inferential analysis. Most of the injured were passengers from Manzanillo and Yara municipalities, and 60% of the fatally injured were from the first city, with ages between 15 and 44 years. Half of them had Cranioencephalic injuries. Most of them were students or workers.

**Conclusion:** Prevalence of Cranioencephalic trauma among the mortal lesions, with the most representative age group between 15 and 44 years in this accident.

**Keywords:** Injured; Collision with a Train; Epidemiology

### Introduction

Nowadays, it is estimated that 50% of patients with encephalic traumatic injuries have been involved in traffic accidents. 63% of them are young adults, with ages from 15 and 24 years, and 34% are 1 to 4 year-old children. The existence of proper legislations addressing the risk factors could help reduce the number of dead and injured from traffic accidents. Encephalic traumatic injury is the leading cause of death in these patients, 50 to 75% according to the statistics. This is supported by the fact that in the United States, for instance, the mortality for traumatic brain lesions caused by car accidents in the decade from 1982 to 1992, exceeded the number of dead on the battlefields during the wars in that nation's history. The human factor has been responsible for 90% of these accidents [1-4].

According to the U.S Office for Safety Analysis, there were 1736 train accidents in 2014. Although not all of the accidents reported injuries, in many cases they suffered from lesions that even caused death. The Office of Safety and Security from the Department of the Railroad Administration has named 5 categories of causes for train accidents, and the number of accidents per causes (some accidents had more than one cause): railway problems (506), lack of signaling (46), defective equipment (946), human factors (675), others (290). The victims of these type of accidents will frequently suffer from terrible lesions, such as broken bones, internal bleeding, lesions to internal organs, head and brain trauma, lesions to the spinal column, paralysis (paraplegia or quadriplegia), burns, amputations or dismemberment, scars and disfigurement, decapitation, and death [5-9].

Only in the first four months of 2016 there were in Cuba 3702 accidents, 118 more than in similar period of 2015. There were also 244 dead people, and only 11 fatal victims less. The number of injured raised to 2 792, 119 more taking into account the period of January to April from the previous year [10].

When the brakes are applied on a train it will take some seconds before it finally stops. Just to have an idea: with a speed of 40 km/h in one second the train can go the distance of 11.1 meters. Trains braking action always takes place gradually, as they lose the pressure in the air pipes. Taking into consideration that 50% of deaths by trauma happen only in seconds or minutes after the accident, with few possibilities of immediate assistance to reduce this mortality, prevention programs and the lesions control must be a priority [11-15].

The Clinical-Surgical Hospital Celia Sanchez Manduley located in Manzanillo, Granma province, Cuba, is on the first level. This publication is aimed at describing the epidemiological behavior of the mortal lesions in the traffic accident between a bus and a train occurred in Yara municipality in 2007 taking into account this Institution’s initial evaluation.

### Material and Methods

A descriptive and retrospective study was made, it includes 26 deceased in a traffic accident between a train and a bus, in a place known as “La Mambisa”, Veguita town, in Yara municipality, Granma province, Cuba. It occurred on October 6<sup>th</sup>, 2007

The sample matched up with the data taken from the Mortality Rate in the Statistics department from “Celia Sánchez Manduley” Surgical, Clinical and Teaching Hospital in Manzanillo municipality, Granma province.

Some of the most significant variables were: age (divided in groups), municipality distribution, occupation and the predominant location of the lesion to know the direct cause of death.

The statistical analysis was made by means of absolute and relative frequencies, which permitted to summarize adequately the whole information.

### Results

In the passengers transport on route Bayamo-Campechuela between 120 and 130 people were traveling one Saturday, on October 6<sup>th</sup>, 2007, short before noon, when the incident took place. At the crossway “La Mambisa” and one meter from the railway, this vehicle made a quick stop but immediately after it kept going just to stop again in the middle of the level crossing (Table1, 2, 3, 4 and 5).

Yara and Manzanillo municipalities had the majority of injured people evaluated by our Institution with 44%, 14 per capita, for a 22%. When the evaluation was made taking into account the fatal victims, Campechuela municipality had the 80% of survivors.

| Municipality   | Alive                  |           | Deceased  |           | Total     |            |
|----------------|------------------------|-----------|-----------|-----------|-----------|------------|
|                | Number of subjects (#) | %         | #         | %         | #         | %          |
| Manzanillo     | 7                      | 50        | 7         | 50        | 14        | 22         |
| Yara           | 10                     | 71        | 4         | 29        | 14        | 22         |
| Bayamo         | 8                      | 66        | 4         | 34        | 12        | 19         |
| Campechuela    | 1                      | 20        | 4         | 80        | 5         | 8          |
| Bartolomé Masó | 2                      | 50        | 2         | 50        | 4         | 6          |
| Guisa          | 1                      | 50        | 1         | 50        | 2         | 3          |
| Buey Arriba    | 1                      | 50        | 1         | 50        | 2         | 3          |
| Pilón          | 1                      | 50        | 1         | 50        | 2         | 3          |
| Media Luna     | 2                      | 100       | -         | -         | 2         | 3          |
| Río Cauto      | 1                      | 100       | -         | -         | 1         | 2          |
| Otros Lugares  | 1                      | 100       | -         | -         | 1         | 2          |
| <b>Total</b>   | <b>35</b>              | <b>57</b> | <b>26</b> | <b>43</b> | <b>61</b> | <b>100</b> |

**Table 1:** Municipality distribution of those evaluated in the Clinical-Surgical Hospital Celia Sanchez Manduley in the accident between a train and a bus in Yara, 2007

| Deceased     |           |            |
|--------------|-----------|------------|
| Municipality | #         | %          |
| Manzanillo   | 7         | 26         |
| Bayamo       | 4         | 15         |
| Yara         | 4         | 15         |
| Campechuela  | 4         | 15         |
| Masó         | 2         | 7          |
| Pilón        | 1         | 3          |
| Guisa        | 1         | 3          |
| B. Arriba    | 1         | 3          |
| <b>Total</b> | <b>26</b> | <b>100</b> |

**Table 2:** Number of deceased per municipality. Train and bus accident, Yara, 2007. Clinical-Surgical Hospital Celia Sanchez Manduley

The municipality with the majority of fatal victims was Manzanillo, 7 in total, 26%. Then Bayamo, Yara and Campechuela with 4 per municipality, 15% per capita.

| Age Group (years) | #         | %          |
|-------------------|-----------|------------|
| <15               | 3         | 11         |
| 15 and 44         | 18        | 60         |
| 45 and 59         | 3         | 11         |
| 60 and more       | 2         | 9          |
| <b>Total</b>      | <b>26</b> | <b>100</b> |

**Table 3:** Number of deceased per age groups. Train and bus accident, Yara, 2007. Clinical-Surgical Hospital Celia Sanchez Manduley

The age group with the biggest percentage was 15 to 44 years, with 18 deceased, which represent 60%.

| Occupation   | Number    | %          |
|--------------|-----------|------------|
| Workers      | 8         | 30.7       |
| Students     | 6         | 23.9       |
| Housewives   | 3         | 11.5       |
| Unemployed   | 3         | 11.5       |
| Unknown      | 4         | 15.3       |
| Retired      | 1         | 3.8        |
| Minor        | 1         | 3.8        |
| <b>TOTAL</b> | <b>26</b> | <b>100</b> |

**Table 4:** Number of deceased by occupation. Train and bus accident, Yara, 2007. Clinical-Surgical Hospital Celia Sanchez Manduley

The 30% of the deceased were workers, 8; and 23.9% students, 6.

| Cause of Death                                 | Number    | %          |
|--|-----------|------------|
| Cranioencephalic contusion                     | 13        | 50         |
| Multiple costal fractures and visceral lesions | 6         | 23         |
| Multiple bone fractures                        | 4         | 15.3       |
| Cerebral laceration                            | 1         | 3          |
| Abdominal traumatism and visceral lesions      | 1         | 3          |
| Múltiples craneal fractures                    | 1         | 3          |
| <b>TOTAL</b>                                   | <b>26</b> | <b>100</b> |

**Table 5:** Number of deceased per cause of death. Train and bus accident, Yara, 2007. Clinical-Surgical Hospital Celia Sanchez Manduley

The main cause of death was the Cranioencephalic contusion, 13 deceased, 50%.

## Discussion



**Figure 1:** Wreckage of the train crash with a bus full of passengers in the Cuban province of Granma. The bus had been dragged by the train and fell off the bridge

The collusion took place at a level crossing in La Mambisa, a small town belonging to Yara municipality. The train dragged the bus, which ended up falling under a bridge. The bus was going from Bayamo to Campechuela city with around 130 passengers, on Saturday, October 6<sup>th</sup>. In record time all injured were taken to assistance centers (Figure 1).

The incident happened 800 kms away from Havana, and it is one of the worst accidents on the island in the last years. Railway accidents with high number of fatalities are very rare in Cuba.

Since 2000 traffic accidents were always the fifth cause of death in Cuba, but in 2009 they came to be the fourth cause for both sexes and for males in particular, yet the fifth cause for females.

In Cuba there are approximately 2000 level crossings. When compared to the number in other countries, our proportion of level crossings per kilometer in railways is significantly lower.

Traffic and train accidents with high numbers of fatal victims are frequent in the world [15,16].

In the United States a suburban train from New Jersey Transit collided with Hoboken's train station (N.J) causing the death of dozens of people, one woman died [17].

In Jakarta, Indonesia, a train from Kereta Commuter Line collided with a bus at a railway cross. 18 people died and other 10 were severely injured. Six people survived after the crash [18].

A bus full of tourists was heading towards the island of Samet, 150 kms from Thailand's capital, when it collided with a train going to Kanchana Burit province. Three people lost their lives and other 30 were injured in a similar accident in the province of Nakhon Pathom, Northeast from Bangkok. According to a study carried out by Michigan University, Thailand have the second most dangerous roads in the world, with a mortality of 44 people per 100.000 inhabitants, only surpassed by Namibia [19].

A regional train going from Nimes and Montpellier (southern France) with 200 people, at a speed of 140 kph hit a tree that had fallen to the rails due to a storm. Three people were severely injured and 10 had minor wounds [20,21].

In Cuba the most fatal accident in the last years took place in Urbano Noris, Holguin province, in 1997. 57 people lost their lives, only 4 survived. All of the victims were from that municipality. The early stages of the Special Period were defined by a general breakdown in the motor vehicle transportation, and therefore the number of accidents decreased. Moreover, both the railway circulation and the incidents at the level crossings decreased as well, but on a smaller scale. Since 1994, even though there is a reduction in the railway traffic, the relationship between level crossing and traffic accidents still has small variations. This is due to the fact that there is a sustained decrease in the vehicle circulation and accidents. On the other hand since 1997 there has been a slight growth in the road circulation and with it a new rise in the traffic accidents. Nevertheless, incidents at level crossings continued to drop to a 0.4% in 2007. There is an average of one accident every 4.8 days at level crossings, one fatality every 23.3 days and one wounded every 4.2 days. However, this type of accident is more dangerous than the traffic ones, yet the percentage of dead and injured is higher, 19% and 27% respectively, being the occupants of the motor vehicles the most damaged. Most of the accidents at level crossings (60%) occur between 9 am and 7 pm (79% of fatalities and 68% of injured). The most dangerous hours are from 11 am and 1 pm, time in which there is 40% of fatalities and 20% of injured. The high accident rates at these intersections are a result of the installation of these equipments in places with more rail flow [22].

At the present it is of great value the existence of programs to prevent accidents and traumatisms as part of the public healthcare strategies.

The staff responsible for the fulfillment of these programs is formed by teaching specialists and healthcare management personnel, medics, paramedics, transit regulations experts, bombers, and emergency units. Hospitals addressing trauma are classified in three levels:

- Level I: They have a full team of experts in the Surgical Specialty, technology (CAT), Operation Rooms, and Intensive Care Units. They also have teaching and research programs, and work in the prevention as well; e.g. Celia Sanchez Manduley Hospital.
- Level II: They do not have the technology described earlier or teaching and research responsibilities, unless there is no Level I hospital in the community.
- Level III: In this level they see 90% of the cases. It is the hospital responding to clinical stabilization, preliminary diagnoses and the preparation of the severely injured for their safe transportation to hospitals of Levels I and II.

## Measures for the Prevention of Traffic Accidents

I - Related with the design and building of cars, speed regulation.

II - The seat belt for passengers reduces the mortality from 40 to 69%.

III - Related to the drivers: fulfillment of the traffic laws and regulations.

IV - Related with better conditions of the roads and optimization of the signs.

The international community has pledged to pay attention to the problem of road safety. One of the Goals for Sustainable Developments has been to reduce by a half the number of deaths and traumatism caused by traffic accidents by the year 2020. This is a golden opportunity to work harder towards preserving life and making these sad statistics drop all over the world [1,4,11,15,23,24].

## Conclusion

In the tragedy occurred on Saturday, October 6<sup>th</sup>, 2007 at the level crossing “La Mambisa” in Yara Municipality, Granma, there was a prevalence of Cranioencephalic trauma among the mortal lesions, with the most representative age group between 15 and 44 years in this accident.

## References

1. Redacción Digital (2015) Traffic accident figures in the world are alarming, according to WHO. Cifras de accidentes de tránsito en el mundo resulta Alarmante, según OMS. Granma.
2. Peñalva P Angel M (2007) Diseño de una carretera versus el comportamiento de los conductores. Adelantamiento, velocidad y distancia de visibilidad [Road design versus driver behavior. Overtaking, speed and visibility distance]. UPCommons.
3. BBC (2016) India train crash: 115 killed in derailment near Kanpur, India.
4. World Health Organization (2013) WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, Geneva, Switzerland.
5. Vargas FD (2016) Oficina Legal de Abogado Fernando Vargas Blog. Accidentes Ferroviarios, USA.
6. McKay MP (2015) Fatal Consequences: Obstructive Sleep Apnea in a Train Engineer. *Ann Fam Med* 13: 583-6.
7. Heydari ST, Hoseinzadeh A, Ghaffarpas F, Hedjazi A, Zarenezhad M, et al. (2013) Epidemiological characteristics of fatal traffic accidents in Fars province, Iran: a community-based survey. *Public Health* 127: 704-9.
8. Modarres SR, Shokrollahi MH, Yaserian M, Rahimi M, Amani N (2014) Epidemiological characteristics of fatal traumatic accidents in Babol, Iran: A hospital-based survey. *Bullet Emerg Trauma* 2: 146-50.
9. Jeon HJ, Kim J, Kim B, Park SJ, Fava M, et al. (2014) Sleep Quality, Posttraumatic Stress, Depression, and Human Errors in Train Drivers: A Population-Based Nationwide Study in South Korea. *Sleep* 37: 1969-75.
10. Agencia Cubana de Noticias (ACN) (2016) Más de tres mil accidente tránsito solo en cuatro meses. La Demajagua.
11. AFP (2016) 27 dead in Egypt bus, train accidents before holiday. *New Straits time Online*, Malaysia.
12. Moharamzad Y, Taghipour H, Firoozabadi NH, Firoozabadi AH, Hashemzadeh M, et al. (2008) Mortality pattern according to autopsy findings among traffic accident victims in Yazd, Iran. *Chinese J Traumatol* 11: 329-34.
13. Piña Tornés AA, Collejo Rosabal Y, Mojena Reyes DM (2013) Epidemiología de la mortalidad por accidentes de tránsito en Granma (2005-2011). *MEDISAN* 17: 575.
14. Chandran A, Sousa TR, Guo Y, Bishai D, Pechansky F (2012) Road traffic deaths in Brazil: rising trends in pedestrian and motorcycle occupant deaths. *Traffic Inj Prev* 13: 11-6.
15. OMS (2015) Informe sobre la Situación Mundial de la Seguridad Vial. Ginebra: Bloomberg Philanthropies.
16. Homayoun SB, Saber AA, Leila A, Alireza Z, Louiz A (2016) Epidemiological Patterns of Road Traffic Crashes During the Last Two Decades in Iran: A Review of the Literature from 1996 to 2014. *Arch Trauma Res* 5: e32985.
17. Pozzi S (2016) Un accidente de tren en Nueva Jersey deja un muerto y docenas de heridos. *El País*. Madrid, Spain.
18. TeleSur TV (2016) Indonesia: accidente entre tren y autobús deja 18 muertos.
19. EFE (2016) 3 muertos y 30 heridos en el choque de un tren y un autobús en Tailandia. Bangkok.
20. LA RAZON (2016) Tres heridos graves y diez leves en un accidente de tren en Francia.
21. Dunya News (2016) Pattoki: 4 killed as goods train crashes into bus, Pakistan.
22. Juventud Rebelde (2007) Comisión Ministerial da a conocer dictamen sobre accidente de tránsito ocurrido en Granma, Spain.
23. Notmix (2016) Quiso cruzar las barreras bajas del tren con su auto y murió.
24. Informador (2016) Autos particulares chocan contra tren en Tlajomulco, Mexico.