Clinical Outcomes of Road Traffic Accident Cases in the Emergency Medicine Department

Juan Carlos Pereira[1], Isabel Montoya Toro[2]

Abstract Introduction: *Road traffic accidents (RTAs) are a significant public health concern worldwide, contributing to substantial morbidity and mortality. Motorcycle accidents, in particular, have been identified as a significant contributor to RTA-related injuries and deaths, especially in regions where motorcycles are a primary mode of transportation. This study aims to describe the epidemiological profile of RTA cases reported to the Emergency Medicine Department (EMD) of a tertiary care hospital.* ***Materials and Methods:*** *A retrospective cross-sectional study was conducted over one year, including all RTA cases presenting to the EMD. Data were collected on demographics, injury patterns, time of arrival, and outcomes. Inclusion criteria comprised all RTA cases, while exclusion criteria included incomplete records and non-trauma-related cases. Data were extracted from hospital records, including patient demographics (age, sex), type of vehicle involved, time of accident, injury patterns, and outcomes (discharge, referral, or death). Injury severity was classified using the Abbreviated Injury Scale (AIS) and Injury Severity Score (ISS).* ***Results:*** *Head injuries are the most common (40%), underscoring the vulnerability of RTA victims to traumatic brain injuries. Fractures account for 27.3% of injuries, often involving limbs due to the impact of collisions. Soft tissue injuries (18.2%) are also prevalent, including bruises, sprains, and lacerations. Internal injuries (9.1%) and spinal injuries (5.5%) are less common but are associated with high morbidity and long-term disability. The majority of cases (54.5%) have mild injuries (ISS 1-8), which are less life-threatening and often manageable with outpatient care. Moderate injuries (ISS 9-15) account for 31.8% of cases, requiring hospitalization and more intensive care. Severe (9.1%) and critical injuries (4.5%) are less frequent but represent the most serious cases, often requiring advanced trauma care and intensive care unit (ICU) admission.* ***Conclusion:*** *RTAs predominantly affect young males, with motorcycle accidents being the leading cause. Preventive measures, including public awareness campaigns and stricter traffic regulations, are urgently needed.*

Keywords: Road traffic accidents, epidemiology, emergency medicine, injury patterns, mortality.

[1] Unidad de Cuidados Intensivos Cardiovascular, Hospital San Vicente de Paúl. Medellín, Colombia
2 Laboratorista Clínica. Mágister en Virología. Coordinadora Científica, Editora Médica Colombiana S.A.

Medicina & Laboratorio 2023;27:297-313. https://doi.org/10.36384/01232576.700.
Received July 20, 2024; accepted August 19, 2024

INTRODUCTION

Road traffic accidents (RTAs) are a leading cause of death and disability globally, particularly in low- and middle-income countries (LMICs). According to the World Health Organization (WHO), approximately 1.35 million people die annually due to RTAs, with an additional 20-50 million sustaining non-fatal injuries. [1] The economic burden of RTAs is staggering, costing most countries 3% of their gross domestic product (GDP). [2] Despite global efforts to reduce RTA-related morbidity and mortality, the problem persists, necessitating localized epidemiological studies to inform targeted interventions. [3]

The Emergency Medicine Department (EMD) is often the first point of contact for RTA victims, making it a critical source of data for understanding the epidemiology of these incidents. Previous studies have highlighted the disproportionate impact of RTAs on young adults, particularly males, who are more likely to engage in risky driving behaviors. [4] Motorcycle accidents, in particular, have been identified as a significant contributor to RTA-related injuries and deaths, especially in regions where motorcycles are a primary mode of transportation. [5]

Understanding the epidemiological profile of RTA cases is essential for developing effective prevention strategies. This includes identifying high-risk groups, common injury patterns, and peak times for accidents. Such data can inform public health policies, such as improved road infrastructure, stricter enforcement of traffic laws, and public awareness campaigns. [6] Additionally, hospital-based studies provide valuable insights into the burden of RTAs on healthcare systems, including resource allocation and emergency response planning. [7]

This study aims to describe the epidemiological profile of RTA cases reported to the EMD of a tertiary care hospital. By analyzing demographic data, injury patterns, and outcomes, we seek to identify key risk factors and inform targeted interventions to reduce the burden of RTAs.

MATERIALS AND METHODS

A retrospective cross-sectional study was conducted at the EMD of a tertiary care hospital over one year. The hospital serves a population of approximately 2 million people and is a major referral center for trauma cases.

Inclusion Criteria

- All patients presenting to the EMD with a history of RTA.
- Complete medical records, including demographic details, injury patterns, and outcomes.

Exclusion Criteria

- Incomplete or missing medical records.
  - Non-trauma-related cases (e.g., medical emergencies

Data Collection:

Data were extracted from hospital records, including patient demographics (age, sex), type of vehicle involved, time of accident, injury patterns, and outcomes (discharge, referral, or death). Injury severity was classified using the Abbreviated Injury Scale (AIS) and Injury Severity Score (ISS)[7].

Statistical Analysis:

Data were analyzed using SPSS version 25. Descriptive statistics were used to summarize demographic and clinical characteristics. Chi-square tests were used to assess associations between categorical variables, and p-values <0.05 were considered statistically significant..

Ethical Considerations:

Ethical approval was obtained from the hospital's Institutional Review Board (IRB). Patient confidentiality was maintained by anonymizing all data.

RESULTS

Table 1: Demographic Characteristics of RTA Cases (n = 110)

Variable	Category	Frequency	Percentage
Sex	Male	82	74.5%
	Female	28	25.5%
Age Group (Years)	0-19	15	13.6%
	20-39	65	59.1%
	40-59	25	22.7%
	≥60	5	4.5%

Males constitute the majority of RTA cases (74.5%), which is consistent with global trends showing that males are more likely to be involved in RTAs due to higher exposure to traffic, risk-taking behaviors, and occupational hazards. Females account for 25.5% of cases, reflecting their lower involvement in high-risk driving activities. The 20-39 age group is the most affected (59.1%), highlighting that young adults are at the highest risk of RTAs. Adolescents (0-19 years) and older adults (≥60 years) represent smaller proportions (13.6% and 4.5%, respectively), suggesting that these groups are less frequently involved in severe RTAs.

Table 2: Distribution of RTA Cases by Type of Vehicle (n = 110)

Type of Vehicle	Frequency	Percentage
Motorcycle	55	50.0%
Car	33	30.0%
Bicycle	10	9.1%
Pedestrian	8	7.3%
Others (e.g., trucks, buses)	4	3.6%

Motorcycles are involved in 50% of cases, making them the leading cause of RTAs. Cars account for 30% of cases, reflecting their widespread use and potential for high-speed collisions. Pedestrians (7.3%) and bicyclists (9.1%) are also vulnerable, emphasizing the need for safer pedestrian pathways and cycling lanes

Table 3: Time of Arrival to the EMD (n = 110)

Time of Arrival	Frequency	Percentage
12 AM - 6 AM	10	9.1%
6 AM - 12 PM	20	18.2%
12 PM - 6 PM	30	27.3%
6 PM - 12 AM	50	45.5%

The majority of RTA cases arrive at the EMD between 6 PM and 12 AM (45.5%), likely due to factors such as reduced visibility, fatigue, and increased traffic during evening hours. Cases are relatively evenly distributed during the day, with 18.2% arriving between 6 AM and 12 PM and 27.3% between 12 PM and 6 PM.

Table 4: Common Injury Patterns (n = 110)

Injury Type	Frequency	Percentage
Head Injury	44	40.0%
Fractures	30	27.3%
Soft Tissue Injuries	20	18.2%
Internal Injuries	10	9.1%
Spinal Injuries	6	5.5%

Head injuries are the most common (40%), underscoring the vulnerability of RTA victims to traumatic brain injuries. Fractures account for 27.3% of injuries, often involving limbs due to the impact of collisions. Soft tissue injuries (18.2%) are also prevalent, including bruises, sprains, and lacerations. Internal injuries (9.1%) and spinal injuries (5.5%) are less common but are associated with high morbidity and long-term disability.

Table 5: Injury Severity Scores (ISS) (n = 110)

ISS Category	Frequency	Percentage
Mild (1-8)	60	54.5%
Moderate (9-15)	35	31.8%
Severe (16-24)	10	9.1%
Critical (≥25)	5	4.5%
Complication	**Open (%)**	**Laparoscopic (%)**
Wound Infection	13.3%	3.3%
Intra-abdominal abscess	3.3%	5%

The majority of cases (54.5%) have mild injuries (ISS 1-8), which are less life-threatening and often manageable with outpatient care. Moderate injuries (ISS 9-15) account for 31.8% of cases, requiring hospitalization and more intensive care. Severe (9.1%) and critical injuries (4.5%) are less frequent but represent the most serious cases, often requiring advanced trauma care and intensive care unit (ICU) admission.

Table 6: Outcomes of RTA Cases (n = 110)

Outcome	Frequency	Percentage
Discharged	90	81.8%
Referred to Specialty Care	10	9.1%
Admitted to ICU	5	4.5%
Death	5	4.5%

Most patients (81.8%) are discharged after treatment, indicating that the majority of RTA cases result in non-fatal injuries. A small proportion (9.1%) are referred to specialty care, suggesting the need for specialized interventions such as orthopedic or neurosurgical management. ICU admission is required for 4.5% of cases, reflecting the severity of injuries in these patients. The mortality rate is 4.5%, highlighting the fatal consequences of severe RTAs, particularly those involving head injuries or high-impact collisions

DISCUSSION

In our study, males constitute the majority of RTA cases (74.5%), which is consistent with global trends showing that males are more likely to be involved in RTAs due to higher exposure to traffic, risk-taking behaviors, and occupational hazards. Females account for 25.5% of cases, reflecting their lower involvement in high-risk driving activities. The 20-39 age group is the most affected (59.1%), highlighting that young adults are at the highest risk of RTAs. Adolescents (0-19 years) and older adults (≥60 years) represent smaller proportions (13.6% and 4.5%, respectively), suggesting that these groups are less frequently involved in severe RTAs.

The findings of this study highlight the significant burden of RTAs on the EMD, with young males being the most affected group. This is consistent with previous studies, which have identified young adults as a high-risk group due to risky driving behaviors and inexperience. [8] Motorcycle accidents were the leading cause of RTAs, underscoring the need for targeted interventions, such as mandatory helmet laws and rider education programs. [9]

In current study, Head injuries are the most common (40%), underscoring the vulnerability of RTA victims to traumatic brain injuries. Fractures account for 27.3% of injuries, often involving limbs due to the impact of collisions. Soft tissue injuries (18.2%) are also prevalent, including bruises, sprains, and lacerations. Internal injuries (9.1%) and spinal injuries (5.5%) are less common but are associated with high morbidity and long-term disability.

Head injuries were the most common injury pattern, reflecting the vulnerability of RTA victims to severe trauma. This aligns with global data showing that head injuries are a leading cause of RTA-related mortality. [10] The peak arrival times between 6 PM and 12 AM suggest that factors such as fatigue, alcohol consumption, and poor visibility may contribute to the high incidence of RTAs during these hours. [11]

In this study, the majority of cases (54.5%) have mild injuries (ISS 1-8), which are less life-threatening and often manageable with outpatient care. Moderate injuries (ISS 9-15) account for 31.8% of cases, requiring hospitalization and more intensive care. Severe (9.1%) and critical injuries (4.5%) are less frequent but represent the most serious cases, often requiring advanced trauma care and intensive care unit (ICU) admission.

In current study most patients (81.8%) are discharged after treatment, indicating that the majority of RTA cases result in non-fatal injuries. A small proportion (9.1%) are referred to specialty care, suggesting the need for specialized interventions such as orthopedic or neurosurgical management. ICU admission is required for 4.5% of cases, reflecting the severity of injuries in these patients. The mortality rate is 4.5%, highlighting the fatal consequences of severe RTAs, particularly those involving head injuries or high-impact collisions.

The mortality rate of 5% in this study is comparable to other hospital-based studies, emphasizing the need for improved pre-hospital care and trauma management systems. [12-16] Strengthening emergency medical services (EMS) and ensuring timely access to trauma care could significantly reduce RTA-related deaths. [17]

This study has several limitations, including its retrospective design and reliance on hospital records, which may be subject to reporting biases. Future studies should consider prospective designs and community-based surveys to provide a more comprehensive understanding of the epidemiology of RTAs.

CONCLUSION

Laparoscopic appendicectomy is a safe and effective alternative to open appendicectomy. It offers significant advantages including reduced postoperative pain, shorter hospital stay, fewer wound infections, and faster return to normal activities. Despite slightly longer operative time, laparoscopic approach should be preferred in uncomplicated cases where expertise and facilities are available.

REFERENCES

1. World Health Organization. Global status report on road safety 2023. Geneva: WHO; 2023.
2. Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
3. Ameratunga S, Hijar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. Lancet. 2006;367(9521):1533-40.
4. Toroyan T. Global status report on road safety: time for action. Inj Prev. 2009;15(4):286.
5. Odero W, Khayesi M, Heda PM. Road traffic injuries in Kenya: magnitude, causes and status of intervention. Inj Control Saf Promot. 2003;10(1-2):53-61.
6. Nantulya VM, Reich MR. The neglected epidemic: road traffic injuries in developing countries. BMJ. 2002;324(7346):1139-41.
7. Bhalla K, Shahraz S, Bartels D, Abraham J. Methods for developing country estimates of the incidence of deaths and non-fatal injuries from road traffic crashes. Int J Inj Contr Saf Promot. 2009;16(4):239-48.
8. Gopalakrishnan S. A public health perspective of road traffic accidents. J Family Med Prim Care. 2012;1(2):144.
9. Mohan D. Road traffic injuries—a neglected pandemic. Bull World Health Organ. 2003;81:684-5.
10. Puvanachandra P, Hoe C, El-Sayed HF, Saad R, Al-Gasseer N, Vecino-Ortiz AI, et al. Road traffic injury and the global health agenda. Lancet. 2012;379(9811):e29-31.
11. Khorasani-Zavareh D, Khankeh HR, Mohammadi R, Laflamme L, Bikmoradi A, Haglund BJ. Post-crash management of road traffic injury victims in Iran: Stakeholders' views on current barriers and potential facilitators. BMC Emerg Med. 2009;9(1):1-8.
12. Kumar GA, Dilip TR, Dandona L, Dandona R. Burden of road traffic injuries in urban India: implications for prevention. BMC Public Health. 2011;11(1):1-12.
13. Peden MM, Sminkey L. World Health Organization dedicates World Health Day to road safety. Inj Prev. 2004;10(2):67.
14. Singh R, Singh HK, Gupta SC, Kumar Y. Pattern, severity and circumstances of injuries sustained in road traffic accidents: A tertiary care hospital-based study. Indian J Community Med. 2014;39(1):30.
15. Odero W. Road traffic injuries in developing countries: magnitude, impact and potential interventions. Reg Health Forum. 2004;8(1):1-9.
16. WHO Regional Office for Europe. European status report on road safety: towards safer roads and healthier transport choices. Copenhagen: WHO; 2009.
17. Dandona R, Kumar GA, Ameer MA, Reddy GB, Dandona L. Under-reporting of road traffic injuries to the police: results from two data sources in urban India. Inj Prev. 2008;14(6):360-5.