

## Descriptive epidemiology of Karachi road traffic crash mortality in 2015

Rashid Jooma,<sup>1</sup> Masood Ali Shaikh<sup>2</sup>

### Abstract

The Karachi city's Road Traffic Injury Research and Prevention Center (RTIRPC), collects Road Traffic Crash (RTC) data on injuries and fatalities from three major public and private hospitals' emergency departments. In the year 2015, 1021 deaths were recorded; with 871 (85.3%) deaths in males. Cumulatively, 286 (28.0%) deaths were recorded in the 21-30year age group, and for 198 (19.4%) RTC fatal victims, the primary vehicle involved was motorbike. Highest number of fatalities were recorded in the month of January i.e. 153 (15.0%), while the lowest number was recorded for June, with 47 (4.6%) fatalities. RTIRPC is a unique surveillance system in Pakistan providing RTC morbidity and mortality burden and trends in the city that needs to be expanded in Karachi, and extended throughout the country to better choreograph preventive measures including health promotion campaigns.

**Keywords:** Road Traffic Fatalities, Surveillance, Karachi, Pakistan.

### Introduction

Road Traffic Crashes (RTCs) are one of the leading causes of injuries and deaths globally.<sup>1,2</sup> In 2013, RTCs were responsible for 1.25 million deaths in the world.<sup>2</sup> The World Health Organization has estimated that in the year 2013, there were 17.4 RTC deaths, per 100,000 population, globally.<sup>2</sup> For Pakistan, the estimated rate was 14.2 RTC deaths per 100,000 population; and that there were 25,781 (95% CI: 20,979-30,582) RTC deaths in 2013, based on WHO's estimate for Pakistan.<sup>2</sup>

The 'Road Traffic Injury Research and Prevention Center' (RTIRPC) is a road traffic injury and death surveillance programme, that has been operational since 2006, in Karachi.<sup>3,4</sup> Using the RTIRPC data for the five-year period from September 2006 to August 2011, a total of 5,753 RTC deaths were reported.<sup>5</sup> Other studies using the RTIRPC data have provided detailed descriptive epidemiological profile of RTC fatalities in Karachi, for the subsequent years. A study based on mortality data from RTIRPC

reported 1130 deaths in the year 2013.<sup>6</sup> Another study using RTIRPC data for the years 2007 to 2014, reported 9129 fatalities during this eight-year period.<sup>7</sup>

In this study, we provide descriptive epidemiology of RTC fatalities in Karachi for the year 2015, using the RTIRPC data.

### Methods and Results

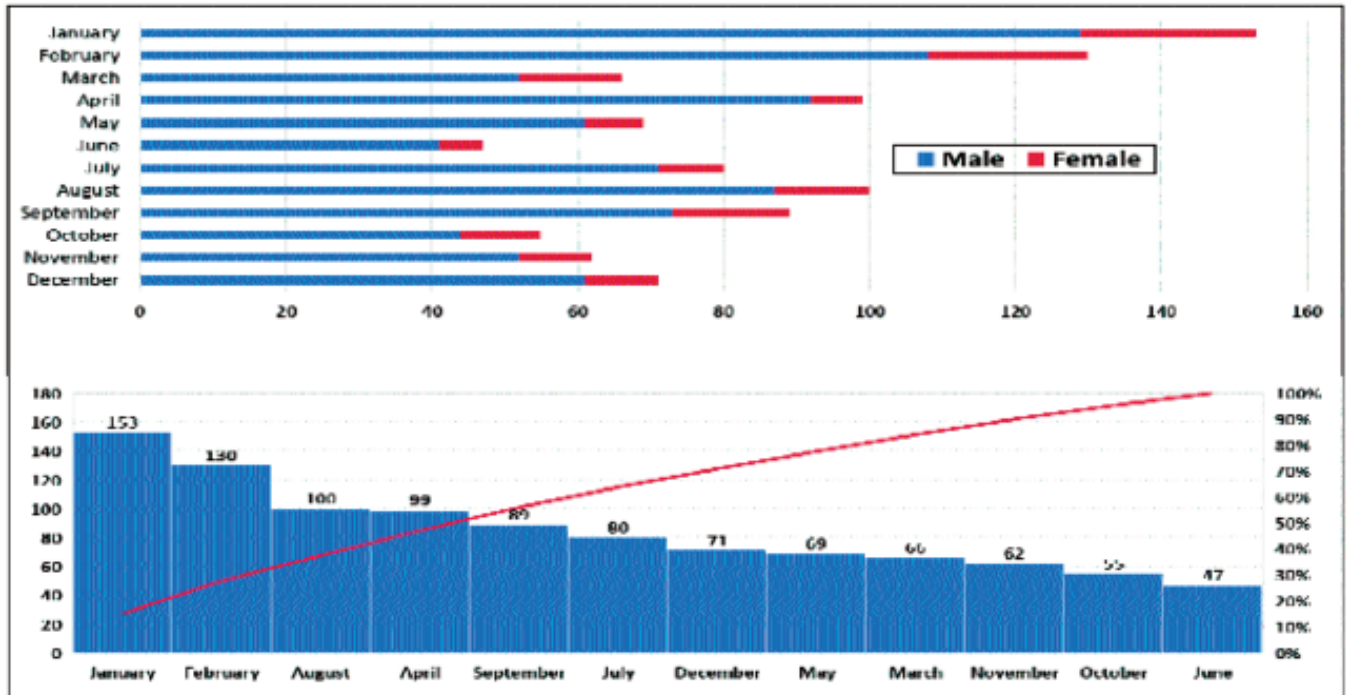
Since September 2006, Road Traffic Injury Research and Prevention Center (RTIRPC) has been operating in Karachi. It is financed by community and corporate donors to study road traffic crashes (RTCs) in the largest city of the country. Now in its twelfth year; the RTC surveillance project is a collaboration between Jinnah Post Graduate Medical Centre (JPMC), Aga Khan University Hospital, NED University of Engineering & Technology, and the

**Table-1:** Profile of the fatal victims of road traffic crashes in Karachi, in terms of their occupation, driver/passenger status, and arrival at trauma center in 2015, disaggregated by gender.

Characteristics	Men (%) N = 871	Women (%) N = 150
<b>Occupation</b>		
Professional	9 (1.0)	2 (1.3)
Skilled	27 (3.1)	0
Semi-Skilled	60 (6.9)	0
Unskilled	81 (9.3)	2 (1.3)
Student	70 (8.0)	11 (7.4)
House Wife	-	53 (35.3)
Law Enforcement	5 (0.6)	0
Drug Addict	2 (0.2)	0
Retired/Old Age	29 (3.3)	7 (4.7)
Other/Unclear	64 (7.4)	3 (2.0)
Missing	524 (60.2)	72 (48.0)
<b>Driver/Passenger Status</b>		
Rider of 2-Wheeler	418 (48.0)	18 (12.0)
Driver of 4-Wheeler	84 (9.6)	7 (4.7)
Pillion Passenger	43 (4.9)	52 (34.7)
Passenger	133 (15.3)	27 (18.0)
Pedestrian	170 (19.5)	44 (29.3)
Missing	23 (2.7)	2 (1.3)
<b>Arrival/brought at trauma center/emergency by</b>		
Ambulance	552 (63.4)	100 (66.7)
Private	39 (4.5)	3 (2.0)
Public	13 (1.5)	1 (0.7)
Missing	267 (30.6)	46 (30.6)

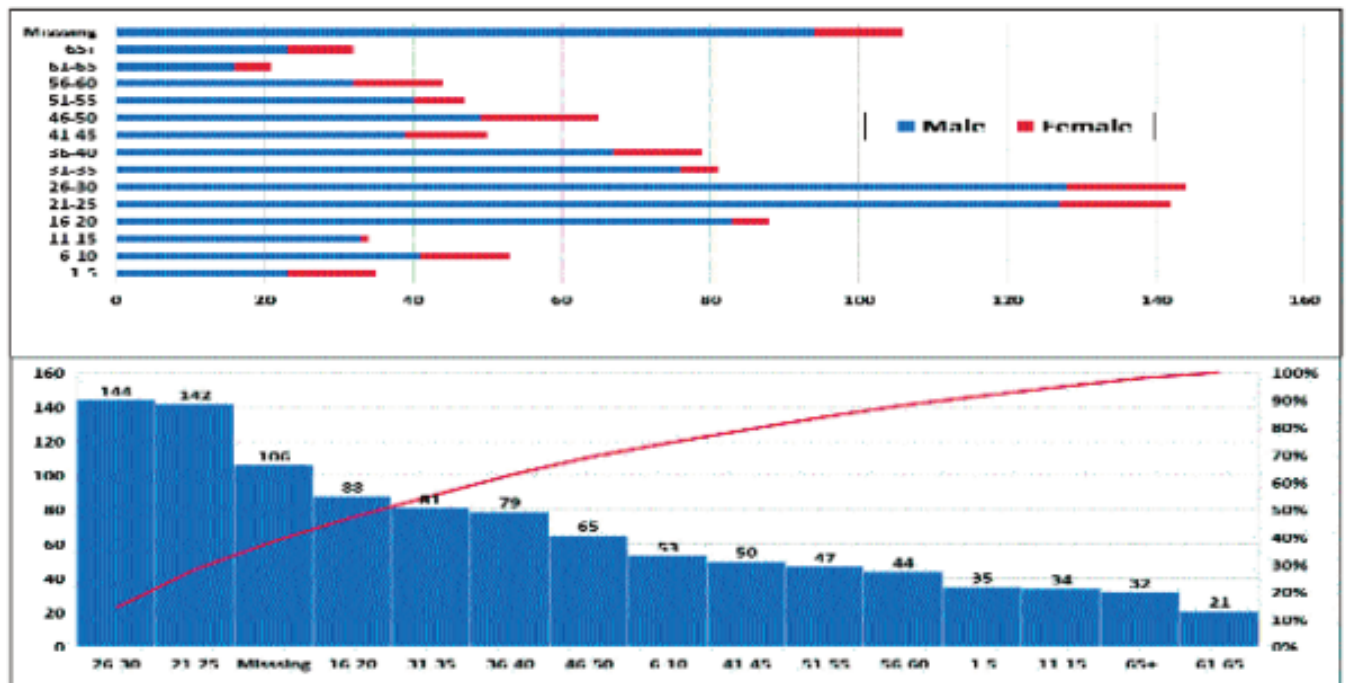
<sup>1</sup>Section of Neurosurgery, Aga Khan University & Principal Investigator, Road Traffic Injury Research & Prevention Center, Karachi, <sup>2</sup>Independent Consultant, Karachi, Pakistan.

**Correspondence:** Masood Ali Shaikh. Email: masoodali1@yahoo.com



The upper graph provides gender disaggregated number of fatalities by month. The lower graph is a Prato chart with cumulative fatalities by month, plotted in descending order of frequency as bars, with cumulative frequency line superimposed and the right-hand axis showing percentage of the total.

Figure-1: Fatalities by month in the year 2015.



The upper graph provides gender disaggregated number of fatalities by 5-year age intervals. The lower graph is a Prato chart with cumulative fatalities by 5-year age intervals, plotted in descending order of frequency as bars, with cumulative frequency line superimposed and the right-hand axis showing percentage of the total.

Figure-2: Fatalities by 5-year age intervals in the year 2015.

**Table-2:** Profile of fatal victims of road traffic crashes in Karachi in terms of primary/secondary vehicle involvement, collision, and location type, in 2015, disaggregated by gender.

Characteristics	Men (%) N = 871	Women (%) N = 150
<b>Vehicle Involvement (Primary)</b>		
Motorbike	174 (20.0)	24 (16.0)
Mini Van/Coaster	28 (3.2)	1 (0.7)
Bus/Minibus/Coaster	147 (16.9)	32 (21.3)
Truck	85 (9.8)	13 (8.7)
Taxi	1 (0.1)	1 (0.7)
Bicycle	3 (0.3)	0
Car	81 (9.3)	10 (6.7)
Water/Oil Tanker	59 (6.8)	15 (10.0)
Rickshaw	13 (1.5)	3 (2.0)
Dumper	24 (2.7)	7 (4.6)
Trailer	34 (3.9)	6 (4.0)
Loading Pickup	18 (2.0)	3 (2.0)
Loading Truck - Other	67 (7.7)	10 (6.7)
Push Cart	1 (0.1)	0
Train	17 (2.0)	2 (1.3)
Qing-qi Rickshaw	7 (0.8)	1 (0.7)
Missing	112 (12.9)	22 (14.6)
<b>Vehicle Involvement (Secondary)</b>		
Motorbike	238 (27.3)	49 (32.7)
Mini Van/Coaster	2 (0.2)	0
Bus/Minibus/Coaster	7 (0.8)	1 (0.7)
Truck	15 (1.7)	2 (1.3)
Taxi	39 (4.5)	11 (7.3)
Bicycle	1 (0.1)	0
Car	13 (1.5)	0
Water/Oil Tanker	61 (7.0)	9 (6.0)
Rickshaw	14 (1.6)	3 (2.0)
Dumper	6 (0.7)	1 (0.7)
Trailer	10 (1.1)	3 (2.0)
Loading Pickup	5 (0.6)	3 (2.0)
Loading Vehicle - Other	6 (0.7)	0
Qing-qi Rickshaw	4 (0.5)	1 (0.7)
Missing/Not Applicable	450 (51.7)	67 (44.6)
<b>Type of collision</b>		
Head-on	95 (10.9)	13 (8.7)
Rear-end	89 (10.2)	28 (18.7)
Hit Object	2 (0.2)	0
Side Swipe	32 (3.8)	8 (5.3)
Right Angle	15 (1.7)	3 (2.0)
Missing	638 (73.2)	98 (65.3)
<b>Type of location</b>		
Intersection	68 (7.8)	17 (11.3)
Mid-block	503 (57.7)	76 (50.7)
U-Turn	4 (0.5)	0
Flyover	9 (1.0)	5 (3.3)
Bridge	18 (2.1)	3 (2.0)
Underpass	1 (0.1)	3 (2.0)
Missing	268 (30.8)	46 (30.7)

Corporation of the City of Karachi.

For the year 2015, RTIRCP collected RTC data from the emergency departments of three major public hospitals in the city: Jinnah Postgraduate Medical Center (JPMA), Civil Hospital Karachi, and Abbasi Shaheed Hospital. Demographic and RTC related data from all injured and deceased victims of RTCs brought/admitted to these hospitals are recorded, from either the victims and/or accompanying persons and then collated at the RTIRCP project office at JPMC. Data collectors are stationed round the clock, at these three sites, to ensure collection and recording of information pertaining to all RTCs victims.

In this descriptive study, we analyzed the data in terms of frequencies and percentages for all the epidemiological characteristics of RTC fatalities for the year 2015, disaggregated by sex, using Open-Source statistical analysis package R 3.3.3. In 2015, cumulatively 1022 deaths were recorded. Males and females accounted for 871 (85.2%) and 150 (14.7%) deaths, respectively. While information about sex was missing for 1 (0.1%) record. In subsequent descriptive analysis, this one case with missing gender information was excluded. Figure-1 shows the number of fatalities by month. Cumulatively, the highest number of fatalities were recorded in January i.e. 153 (15.0%), while the lowest number was recorded for June with 47 (4.6%) fatalities. Figure-2 shows the number of fatalities by age, in terms of five-year age intervals. Cumulatively, highest number of fatalities were recorded for the 26-30 year age group with 144 (14.1%), while lowest number of fatalities were recorded in the 61-65 age group. However, for 106 (10.4%) fatalities, information on age was not available. In both figures i.e. 1 and 2, the lower graph is a Pareto chart that the categories (months and 5-year age intervals) in descending order of frequency, with cumulative frequency line superimposed upon the bars and right-side axis showing the percentage of the total.

Table-1 shows the gender disaggregated fatal victims of road traffic crashes in Karachi by their occupation, driver/passenger status, and arrival at trauma center, in 2015. Cumulatively, 83 (8.1%) fatal victims of RTCs belonged to the unskilled group in terms of occupation, and 81 (7.9%) were students. However, for 596 (58.4%) of fatal RTC victims, information on occupational status was not available. In terms of rider/passenger status, cumulatively 436 (42.7%) were rides of two-wheeler vehicles, while this information was missing for 25 (2.4%) RTC fatal victims. Cumulatively, most of the RTC fatal victims i.e. 652 (63.9%) were brought to the trauma centers/emergency rooms by ambulances. Table-2, shows the gender disaggregated fatal victims of road traffic crashes in Karachi, in terms of primary/secondary vehicle

involvement, collision, and location type, in 2015. Cumulatively, for 198 (19.4%) RTC fatal victims, the primary vehicle involved was motorbike. While, cumulatively, for 287 (28.1%) RTC fatal victims the secondary vehicle involved was motorbike. However for 134 (13.1%), and 517 (50.6%) RTC fatal victims this information i.e. primary and secondary vehicle involvement, was either missing or was not applicable, respectively. Regarding type of collision, cumulatively 117 (11.5%) rear-end collision was recorded as the most common type; with missing information for 736 (72.1%) RTC fatal victims. Regarding type of location where RTC fatalities occurred, the most common location was mid-block, reported for 579 (56.7%) victims; this information was missing for 314 (30.8%) fatalities.

## Discussion

The previously reported descriptive epidemiological profiles of fatalities for the years 2006 to 2014, using RTIRPC data was based on all RTC deaths in the Karachi city, from five major public and private hospitals.<sup>6,7</sup> However, for the year 2015, RTIRPC has been collecting data from three of the original five hospitals. The RTC fatalities profile for the year 2015 echo previously published findings from Karachi and globally. There were 1021 RTC deaths for which information on gender was available; out of these deaths 871 (85.3%) were in males. While for the period 2007-2014, there were 9129 deaths reported, with males comprising 8008 (87.7%) of fatalities.<sup>7</sup>

Regarding fatalities by month of year; highest number of fatalities were reported for January 2015, while previous study reporting on 8-year period using RTIRPC data reported highest number of fatalities in the month of August.<sup>7</sup> Regarding fatalities by age, the highest number of fatalities were recorded for the age group 16-30 years in 2015; this is similar to what was recorded in the previous study from Karachi of 8-year period.<sup>7</sup> And the WHO report for the year 2013; which also identified 15-29 year group in which RTCs were the leading cause of death globally.<sup>2</sup> Unskilled individuals — primarily males — were the occupational group, in which most fatalities were reported in 2015, as well as the 8-year period study.<sup>7</sup> Similarly, results from 2015 and 8-year period study reveal similar pattern of fatalities in terms of driver/passenger status; with most deaths recorded for riders of two-wheeler vehicles on the roads. Regarding type of location where fatalities occurred, and type of collisions that resulted in fatalities; again our results from 2015 echo the

8-year period study.<sup>7</sup> Both reporting mid-block location type, and rear-end collisions as the most frequent kind resulting in death. Regarding arrival at trauma centers/emergency departments, the most common mode was ambulance in the year 2015 as well as in the 8-year period study.<sup>7</sup> However, our results for the year 2015 as well as the 8-year period study; for sizable fatalities, information was missing. Hence the need for caution in interpreting these findings. Nonetheless, in spite of sizable missing information, the results from the year 2015 echo what has been previously reported.

RTIRPC is a distinct surveillance system in the country that provides RTC morbidity and mortality trends in the country.<sup>8</sup> RTIRPC needs to be expanded in the city of Karachi, and similar surveillance system needs to be extended throughout the country for better understanding of RTC morbidity and mortality burden in Pakistan to better choreograph preventive measures, including health promotion campaigns.

**Disclaimer:** None to declare.

**Conflict of Interest:** The first author being incharge of the Karachi's Road Traffic Injury Research and Prevention Center (RTIRPC) has signed the IRB statement declaring that ethical approval has been granted for the conduct of analysis on the RTIRPC's data for the year 2015.

**Funding Disclosure:** None to declare.

## References

1. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016; 388: 1459-544.
2. World Health Organization. Global status report on road safety 2015. WHO Geneva: 2015.
3. Shamim S, Razzak JA, Jooma R, Khan U. Initial results of Pakistan's first road traffic injury surveillance project. *Int J Inj Contr Saf Promot*. 2011; 18:213-7.
4. Razzak JA, Shamim MS, Mehmood A, Hussain SA, Ali MS, Jooma R. A successful model of Road Traffic Injury surveillance in a developing country: process and lessons learnt. *BMC Public Health*. 2012; 12:357.
5. Jooma R. Beyond Theaters-Departments of Surgery Newsletter. Aga Khan University. 2012; 8:12-14.
6. Jooma R, Shaikh MA. Epidemiology of Karachi road traffic crash mortality in 2013. *J Pak Med Assoc*. 2015; 65:548-51.
7. Jooma R, Shaikh MA. Descriptive epidemiology of Karachi road traffic crash mortality from 2007 to 2014. *J Pak Med Assoc*. 2016; 66:1475-80.
8. Jooma R, Shaikh MA. Road traffic crash related injured and fatal victims in Karachi from 2007 to 2014: A time-series analysis. *J Pak Med Assoc*. 2017; 67:622-6.