

ROAD ACCIDENTS IN INDIA

[*trend analysis*]

BY: DEV PREETI KAUSHIK
DEV PRIYA KAUSHIK



Data source:

MINISTRY OF ROAD TRANSPORT AND
HIGHWAYS
[TRANSPORT RESEARCH WING]

ROAD ACCIDENTS IN INDIA 2022
PUBLICATIONS

Data source:

MINISTRY OF ROAD TRANSPORT AND
HIGHWAYS
[TRANSPORT RESEARCH WING]

ROAD ACCIDENTS IN INDIA 2022
PUBLICATIONS

INTRODUCTION

India has witnessed a concerning rise in road accidents, making it one of the countries with the highest fatality rates globally. According to recent statistics, thousands of lives are lost each year due to road mishaps, with significant injuries affecting countless others. The alarming trend is driven by various factors, including rapid urbanization, increased vehicle density, and inadequate road infrastructure. As more people move to urban areas seeking better opportunities, the volume of traffic has surged, often outpacing the development of safe roadways and traffic management systems.

Additionally, issues such as reckless driving, over speeding, and distracted driving contribute to the growing number of accidents. The lack of awareness regarding road safety regulations further exacerbates the situation. Despite government initiatives aimed at enhancing road safety—such as stricter enforcement of traffic laws and awareness campaigns—the challenges remain substantial.

Addressing these trends is crucial for developing effective strategies to mitigate risks and promote safer road usage. By analyzing accident data and identifying high-risk areas, stakeholders can implement targeted interventions to protect lives, improve public health, and reduce economic losses associated with road accidents. Ultimately, a collective effort is needed to foster a culture of road safety in India.

AIMS AND OBJECTIVES

- Analyzing the trends and variations in the total number of road accidents over the years. Providing insights into the frequency and severity of each accident type.
Analyzing the number of fatalities resulting from road accidents
- Identifying any notable spikes or declines in accidents and exploring the potential reasons behind them.
- Examining the distribution of road accidents across different states or regions.
Highlighting areas with higher accident rates and investigating potential contributing factors.
- Conducting a demographic analysis of casualties in road accidents. Identifying factors like age, gender, occupation, etc., that influence the likelihood of being a casualty.
Understanding the demographics of high-risk groups and tailoring safety measures accordingly.
- Discussing interventions and policies aimed at minimizing the severity of injuries.
- Exploring existing measures to reduce the number of fatalities and improve road safety. Identifying key areas for improvement to reduce the occurrence of specific accident types.
- Providing actionable recommendations based on the report's findings. Presenting potential courses of action for decision-makers to address the identified issues.
Offering guidance on how to implement the recommendations effectively.

LITERATURE REVIEW

literature review of the papers related to road accidents in India:

1. Road Safety in India: Status Report 2021 by IIT Delhi

Summary: This report provides an overview of road safety in India, highlighting the current state of road accidents, fatalities, and injuries.

Methodology: The study analyzed data from various sources, including the Ministry of Road Transport and Highways, National Crime Records Bureau, and World Health Organization.

Findings:

- India accounts for 10% of global road fatalities
- 71% of road fatalities occur on rural roads
- Driver error is the primary cause of accidents (82%)
- Speeding is the leading contributor to road fatalities (66.5%)

2. Road Accidents in India 2021 by Ministry of Road Transport and Highways

Summary: This report presents statistics on road accidents in India, including trends, causes, and consequences.

Methodology: The study analyzed data from police records, transport departments, and other government agencies.

Findings:

- 151,417 road accidents occurred in 2021, resulting in 53,903 fatalities
- 74% of accidents occurred on national highways
- Driver fault (78.5%) and road conditions (12.5%) are primary causes of accidents

3. Road traffic accident paradigms in Bengaluru: An empirical study by S. M. Tauseef et al. (2020)

Summary: This study investigates road accident patterns in Bengaluru, analyzing factors contributing to accidents.

Methodology: The study used a mixed-methods approach, combining survey data with statistical analysis.

Findings:

- Speeding (61.4%) and reckless driving (21.1%) are primary causes of accidents
- Two-wheeler riders are most vulnerable to accidents (43.8%)
- Accident hotspots identified using geographic information systems (GIS)

4. Road Accident Analysis: A Case Study on National Highway by A. K. Singh et al. (2019)

Summary: This case study analyzes road accidents on a national highway, identifying causes and recommending safety measures.

Methodology: The study used a combination of statistical analysis and field observations.

Findings:

- Speeding (55%) and driver fatigue (21%) are primary causes of accidents
- Road geometry and design contribute to accidents (15%)
- Recommendations include improved road design, enforcement, and education

5. Mumbai – Pune Expressway Road Accident Study by V. R. Patil et al. (2018)

Summary: This study investigates road accidents on the Mumbai-Pune Expressway, analyzing factors contributing to accidents.

Methodology: The study used a combination of statistical analysis and field observations.

Findings:

- Speeding (52%) and reckless driving (23%) are primary causes of accidents
- Tire burst (14%) and vehicle design (11%) contribute to accidents
- Recommendations include improved road maintenance, enforcement, and education

Conclusion: These studies highlight the severity of road accidents in India, emphasizing the need for improved road safety measures. Key factors

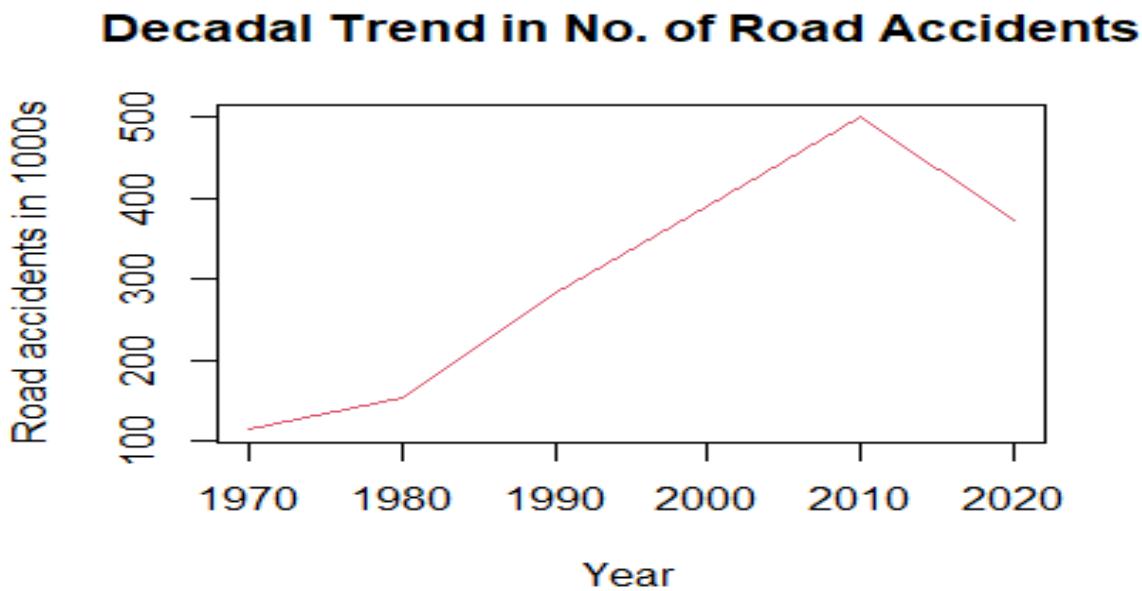
contributing to accidents include driver error, speeding, and poor road conditions.

Research Gaps:

- Limited studies on road accident prevention strategies
- Need for more empirical research on road user behaviour
- Integration of technology and data analytics for road safety improvement

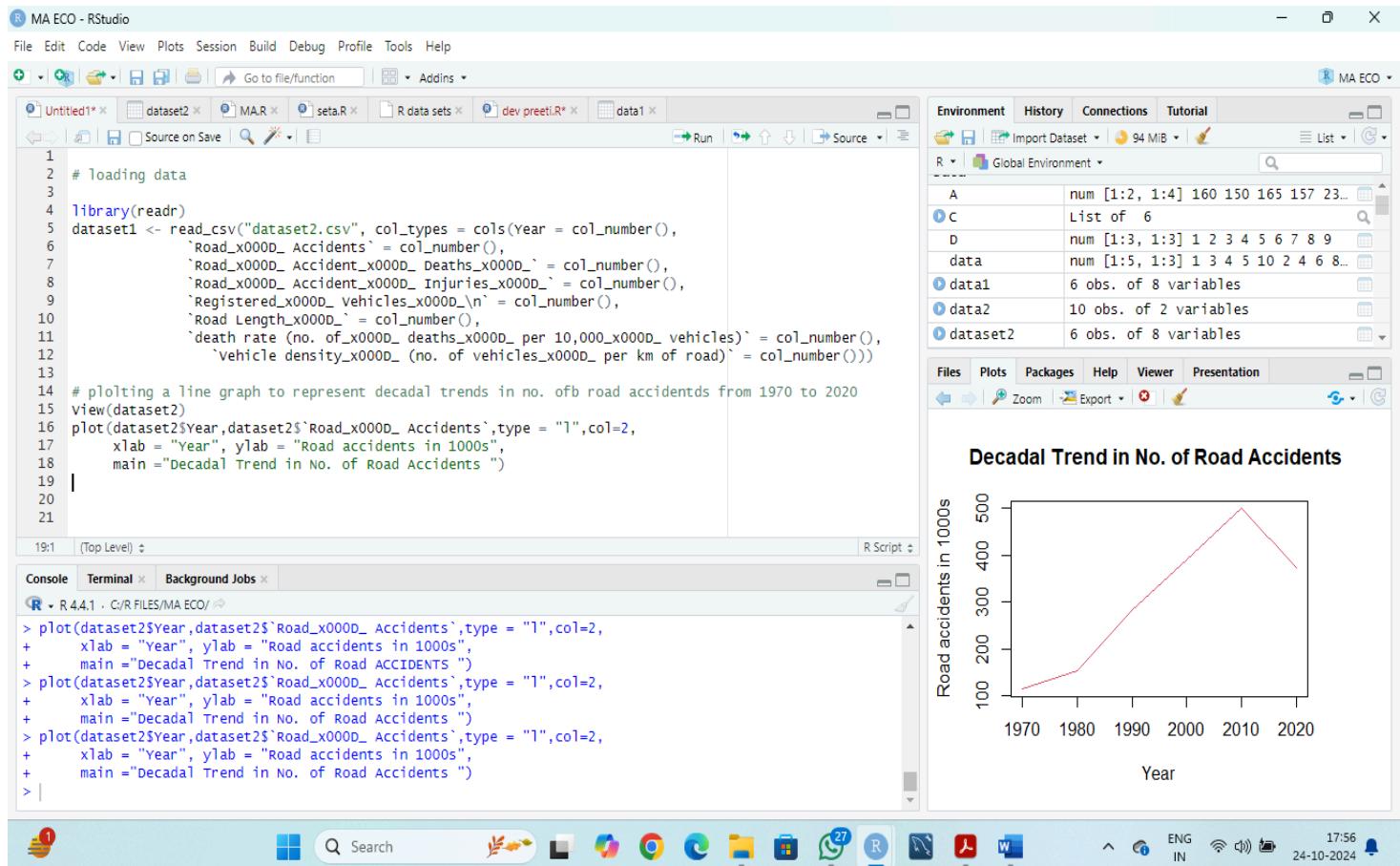
DECADAL TRENDS [1970-2020]

Decadal Growth Rate of Road Accidents portrays that road accidents and death had peaked during 1980-1990. Subsequently, the growth rate had declined over the decades. During the current decade, road accidents/ fatalities and injuries recorded a decline in growth and turned to negative growth



Note: In 2020, reduction in Road Accidents, death and injuries have been recorded, which is due to restriction imposed on movement of vehicle across the country on account of COVID pandemic

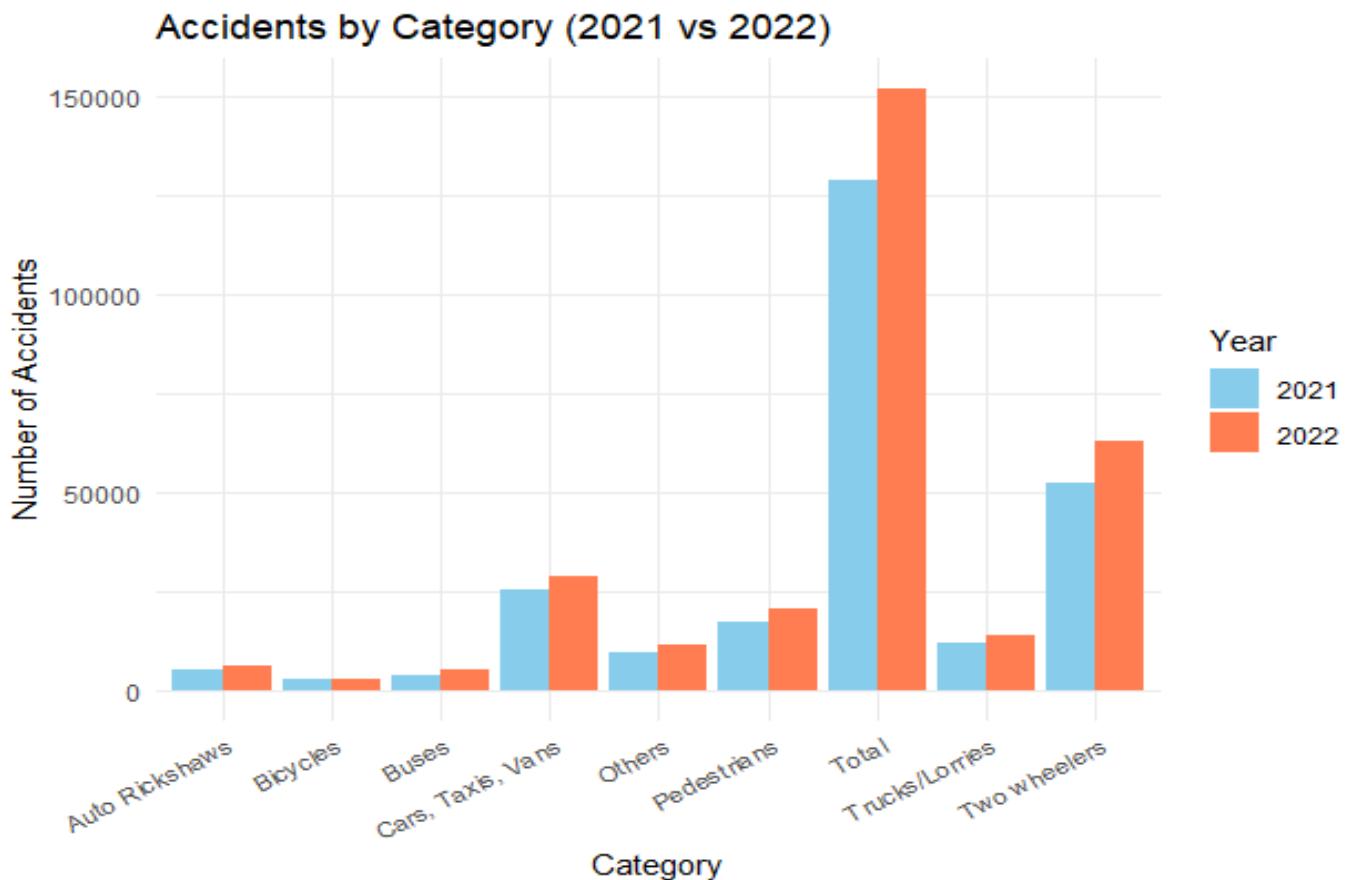
FIGURE1



Road Accident and Fatalities by Road User category wise

Road accidents and fatalities on NH by various category of Road user are presented in figure2 reveals that

- two wheelers recorded the highest number of accident (63,115) and death (25,228) in 2022 followed by 'Cars, Taxis and Vans'.
- All categories except 'bicycles' registered an increase in number of accidents and fatalities in 2022 over 2021.
- The data reveals that two wheelers accounted for 41.5 percent of total accident deaths on National Highways followed by cars, taxis, Vans.
- The percentage share of accidents and deaths by different road users categories on NH are not much different as compared to total road network



Plot 1: Accidents by Category (2021 vs 2022)

This plot compares the number of accidents in each category for the years 2021 and 2022.

Insights:

- **Two-Wheelers and Cars:**

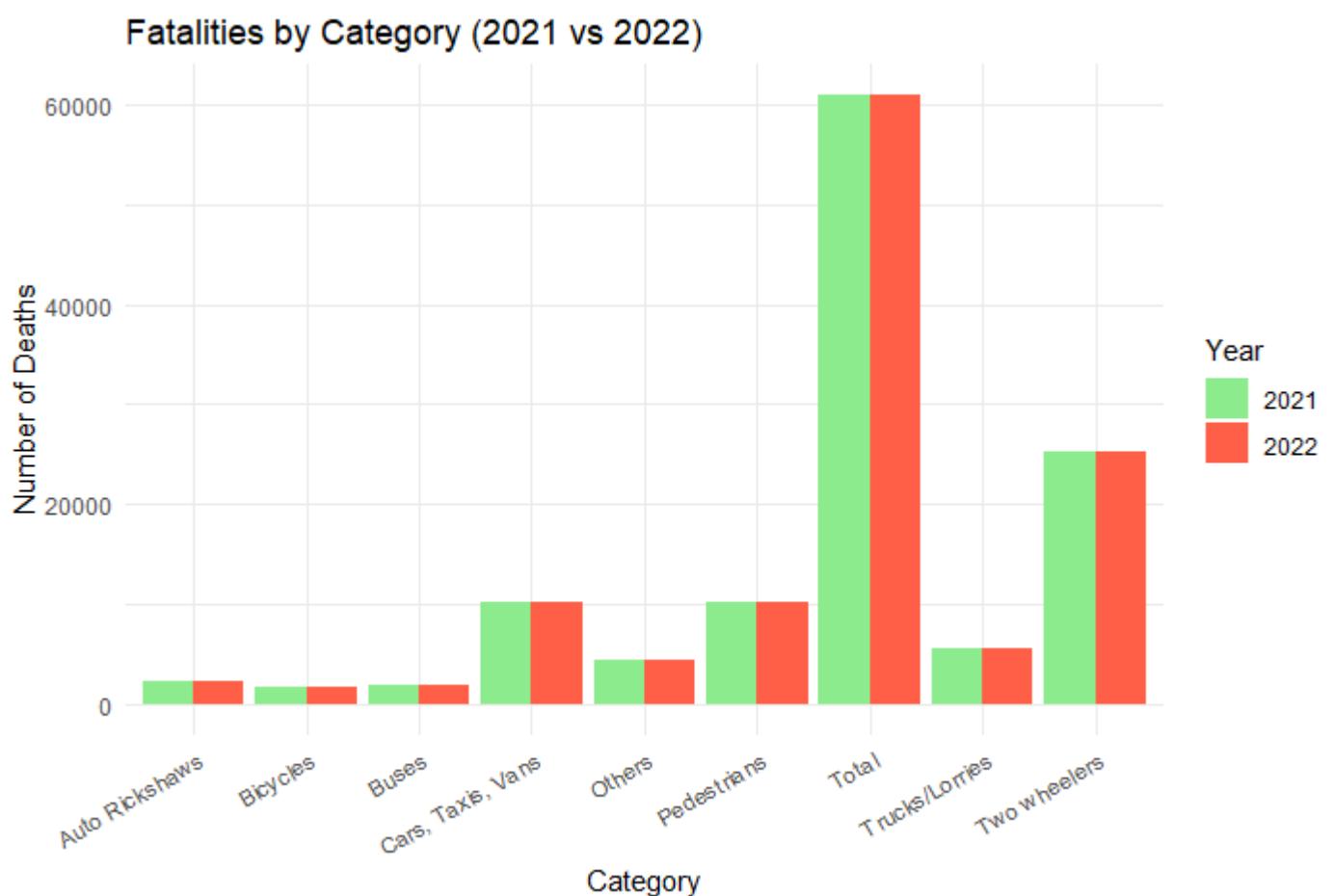
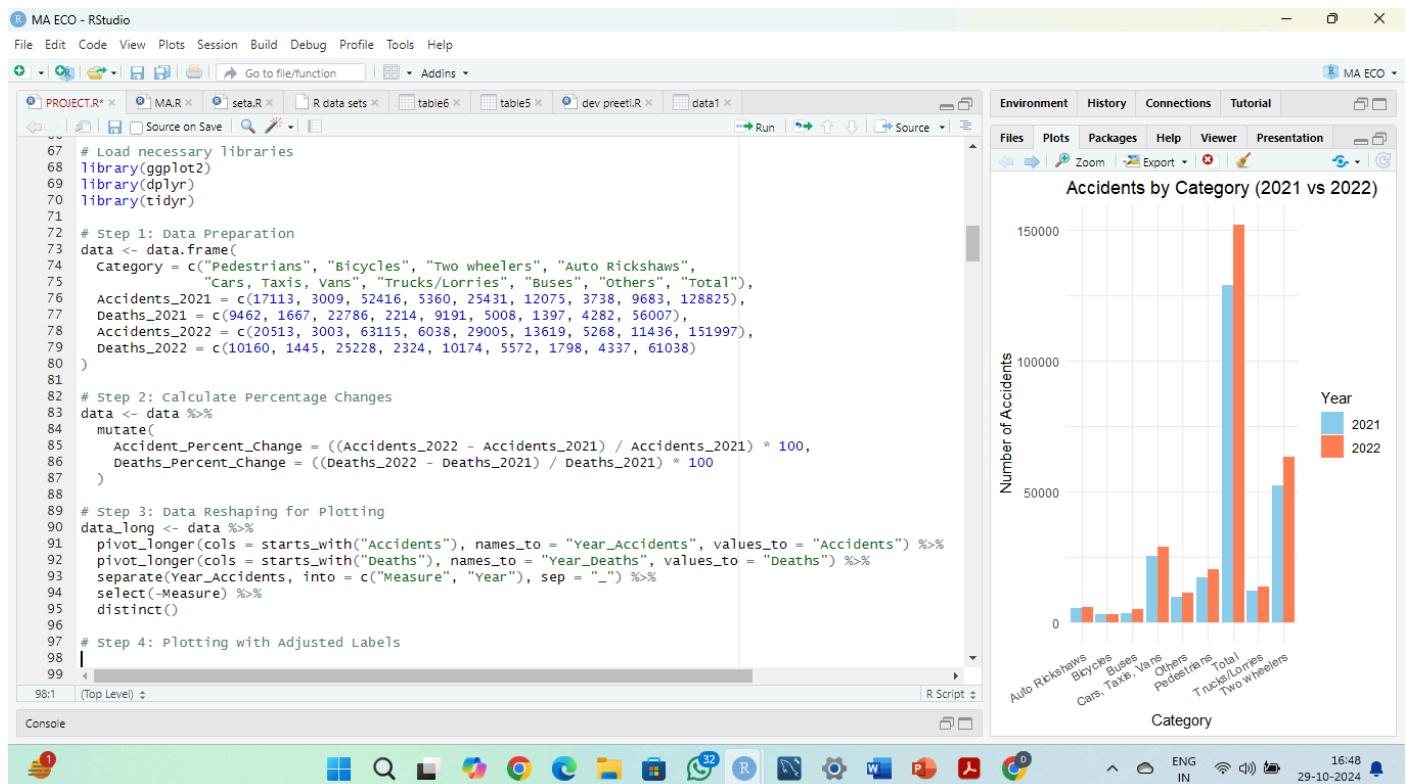
Two-wheelers and cars (including taxis and vans) had the highest number of accidents in both years, with a noticeable increase in 2022. This suggests that these vehicle types contribute heavily to road incidents, likely due to high usage and vulnerability in traffic.

- **Buses:**

Buses showed the largest relative increase in accidents, jumping from around 3,700 in 2021 to over 5,200 in 2022. This sharp increase could reflect risks associated with public transport or a potential increase in bus usage post-pandemic.

- **Trucks/Lorries and Auto Rickshaws:**

Both categories saw a moderate rise in accidents, pointing to a consistent risk associated with heavy vehicles and public transport. The increase in truck lorries accidents suggests the need for stricter monitoring and regulations for larger vehicles on the road

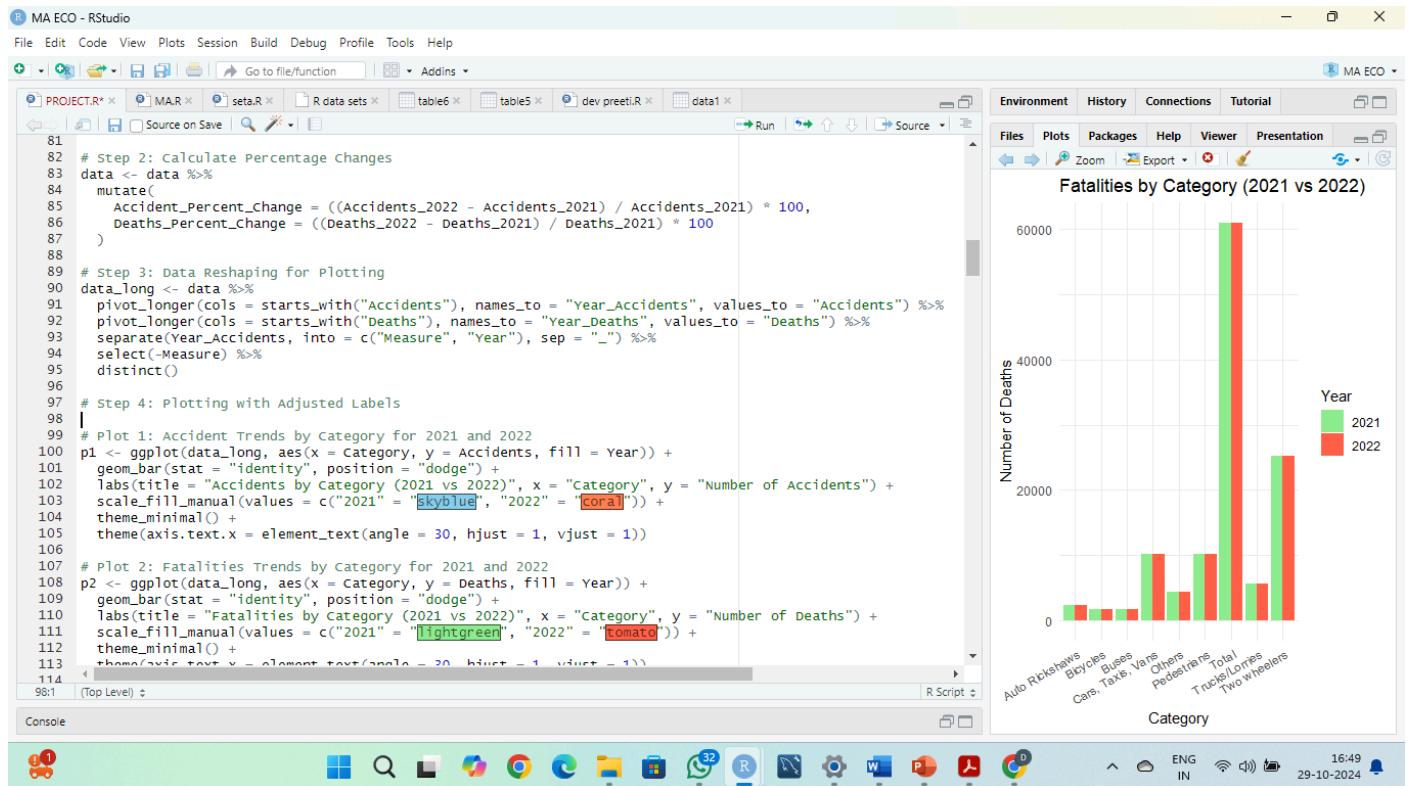


Plot 2: Fatalities by Category (2021 vs 2022)

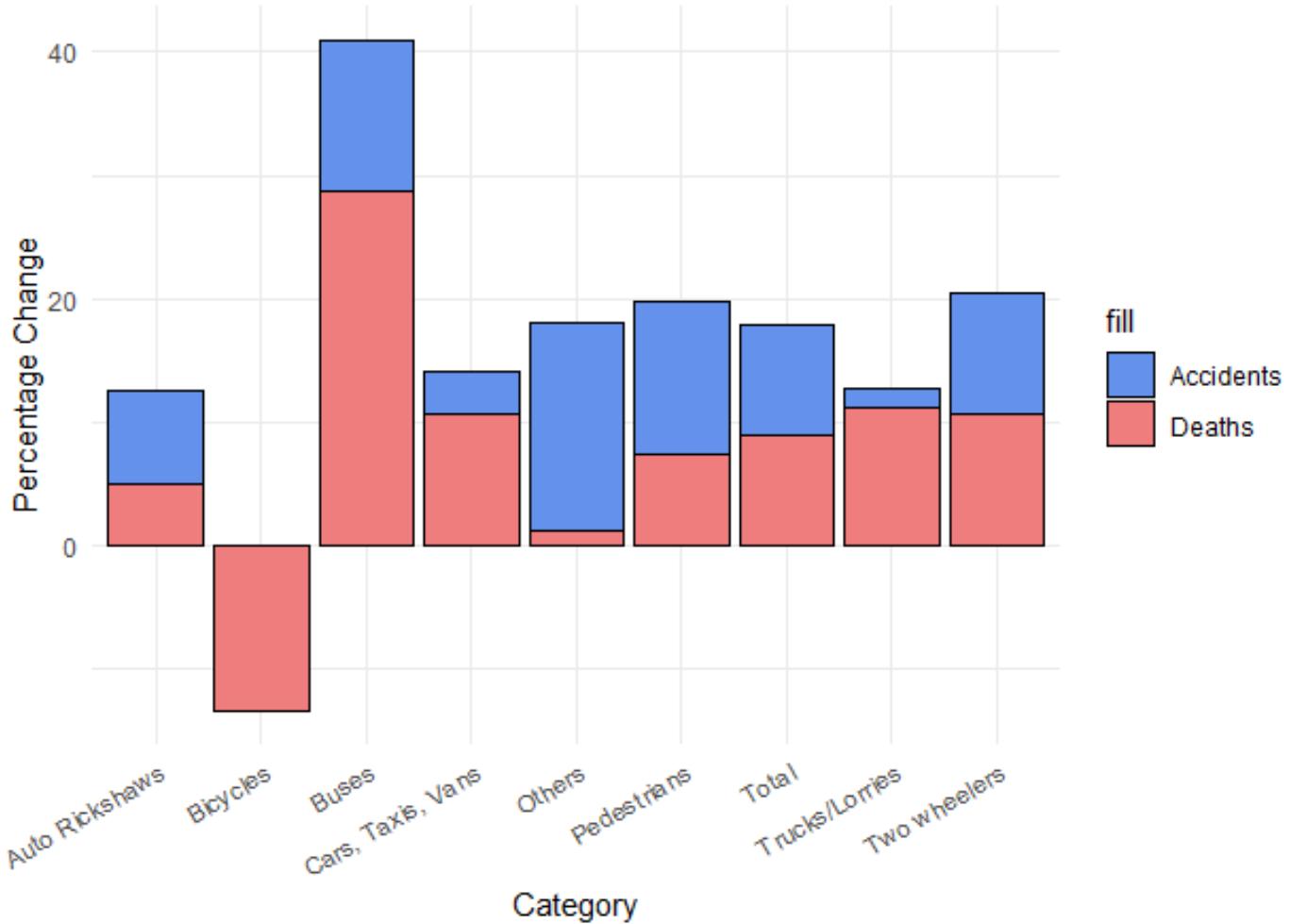
This plot compares the number of fatalities in each category for 2021 and 2022.

Insights:

- **High Fatalities for Two-Wheelers:**
 - o Two-wheelers had the highest fatalities in both years, increasing from around 22,800 in 2021 to over 25,200 in 2022. This emphasizes the vulnerability of two-wheeler riders on the road and may indicate a need for enhanced safety measures, such as helmet laws and separate lanes for two-wheelers.
- **Significant Rise in Pedestrian Fatalities:**
 - o Pedestrian fatalities increased from approximately 9,462 in 2021 to 10,160 in 2022. This suggests that pedestrians continue to be at high risk, potentially due to limited infrastructure, lack of crosswalks, or unsafe driver behavior in pedestrian-heavy areas.
- **Rising Fatalities for Buses and Trucks/Lorries:**
 - o Fatalities associated with buses and trucks also saw substantial increases, pointing to potential safety concerns for large vehicles. Bus fatalities rose notably, aligning with the rise in bus accidents and suggesting an increased risk to passengers and others on the road.



Percentage Change in Accidents and Fatalities from 2021 to 2022



Plot 3: Percentage Change in Accidents and Fatalities from 2021 to 2022

This plot shows the percentage change in accidents and fatalities for each category between 2021 and 2022.

Insights:

- **Largest Increase in Buses:**
 - Buses saw the highest percentage increase in accidents (40.9%) and a substantial rise in fatalities (28.7%). This indicates a growing safety issue with bus operations, which could stem from increased bus traffic, driver fatigue, or inadequate infrastructure.
- **Moderate Increases in Auto Rickshaws and Cars:**
 - Both auto rickshaws and cars (including taxis and vans) showed moderate increases in accidents and fatalities (around 10–15%). This steady rise highlights ongoing safety concerns for these frequently used vehicles.
- **Decrease in Bicycle Fatalities:**
 - Bicycle fatalities decreased by 13.3%, even though accident numbers remained stable. This could reflect improved safety measures or awareness for cyclists, possibly through better cycling infrastructure or road safety campaigns.
- **Slight Increase in "Others" Category:**
 - The "Others" category showed an 18.1% increase in accidents but only a slight rise (1.3%) in fatalities, suggesting a broader distribution of non-fatal incidents across various less common vehicle types or road users.

Overall Analysis

1. Increasing Vulnerability of Two-Wheelers and Pedestrians:

- Two-wheeler riders and pedestrians remain the most vulnerable groups on the road, with significant increases in both accidents and fatalities. This underscores the need for dedicated safety measures, like protected lanes for two-wheelers and improved pedestrian infrastructure.

2. Rise in Bus-Related Incidents:

- The high percentage increase in both accidents and fatalities for buses indicates potential safety issues in public transportation. This could require regulatory attention, driver training, and improvements in public transport management.

3. Consistent Risk with Heavy Vehicles (Trucks/Lorries):

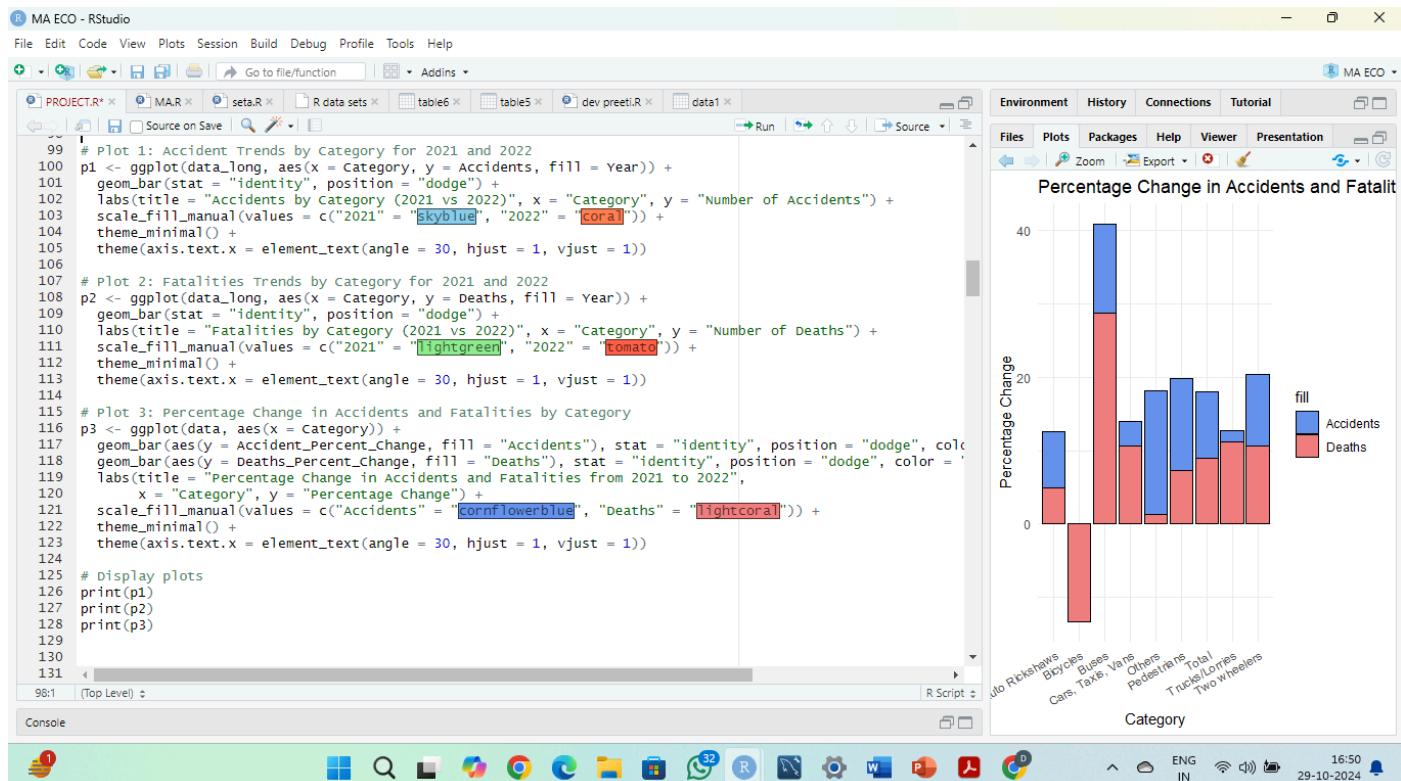
- Trucks and lorries continue to contribute to accidents and fatalities, highlighting the need for stricter enforcement of road safety regulations for heavy vehicles, including speed limits and fatigue management for drivers.

4. Improvement in Bicycle Safety:

- The reduction in bicycle fatalities suggests some positive impact of safety measures or public awareness, even though accident numbers remained constant. This trend should encourage further efforts to protect cyclists.

5. High Overall Growth in Accidents and Fatalities:

- With an 18% increase in total accidents and a 9% rise in fatalities from 2021 to 2022, this data points to an overall worsening trend in road safety. This highlights the urgent need for comprehensive road safety policies, infrastructure improvements, and awareness campaigns to address the increased risk across almost all road user categories



Road accidents attributable to various types of traffic rules violations reveals that

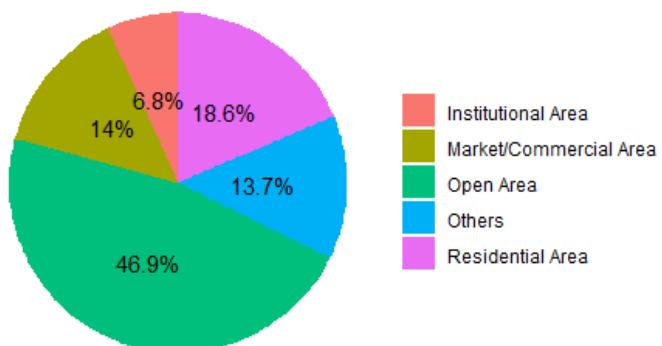
'over speeding' constitute the main violation associated with accidents, fatalities and injuries, in 2022 (Chart 3.1). During 2022, 'over speeding' accounting for 72.3 percent of the total road accidents, 71.2 percent of total deaths and 72.8 percent of total injuries. The number of accidents, fatalities and injuries due to "over speeding" increased by 12.8 percent, 11.8 percent and 15.2 percent respectively in 2022 relative to 2021 (Table 3.1). 'Driving on wrong side' was the second highest cause of the total road accidents during 2022 accounting for 4.9 percent. 3.4 Violation of any traffic rule constitutes human error or driver's fault. However, from the perspective of road safety strategy, violations such as over speeding and driving on wrong side do not constitute human error alone but it may be due to lack of education and enforcement. Moreover, the possible fault in road design may also be the reason of traffic rule violation, which opens the scope for road engineering measures to address problems which are *prima facie*, considered to be human error. 3.5 Drunken driving/consumption of alcohol & drugs, jumping of red light and use of mobile phones taken together accounted for 7.4 percent of total accidents and 8.3 per cent of total deaths. The others category which would include reasons like road environment, vehicular condition etc. accounted for 18.2 percent of the accidents, 18.1 percent of fatalities and 18.1 percent of injuries. State wise details on various types of traffic rules violations for the year 2022 are presented

ROAD ACCIDENTS CLASSIFIED BY TYPE OF NEIGHBOURHOOD

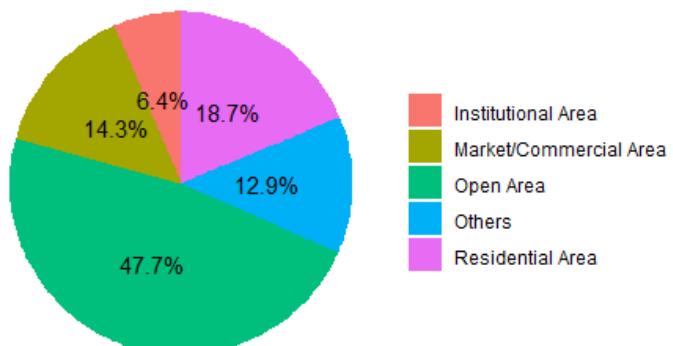
Indicators of neighbourhoods reveals that, there was an increase in number of accidents, fatalities and injuries in 2022 relative to 2021. Residential area, institutional area and market/commercial area trend to have traffic congestion and hence, higher exposure to road accidents. The data for 2022, however, reveal that 47.7 percent of accidents, 55.1 percent of death and 48.2percent of injuries occurred in open area, i.e., locations which normally do not have any human activities in the vicinity (Chart 3.3). Residential area was in the second place with 18.7 per cent of total accidents, and 17.8 per cent of total fatalities and 17.8

percent of total injuries. Market/ commercial area accounted for 14.3 per cent of total accidents and 11.8 percent of fatalities.

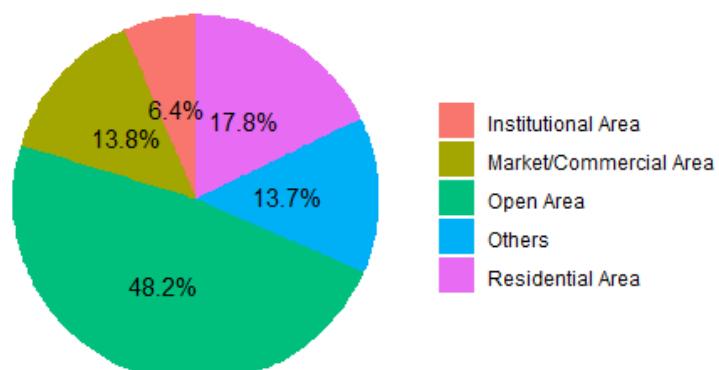
Accidents in 2021



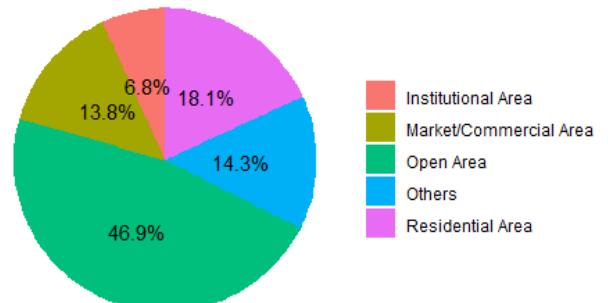
Accidents in 2022



Injuries in 2022



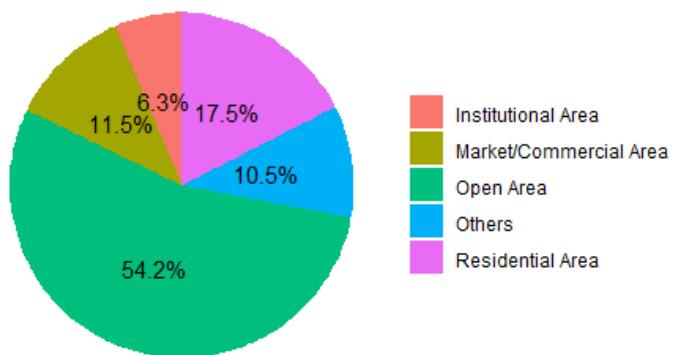
Injuries in 2021



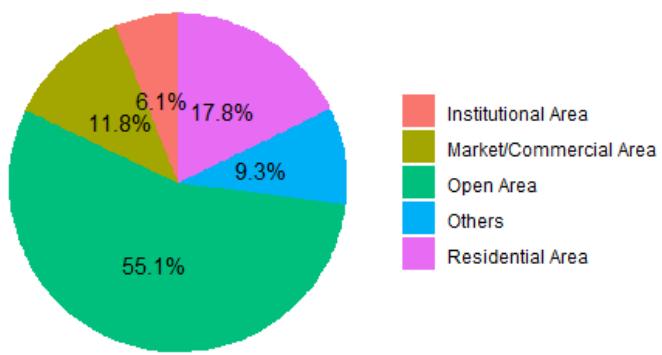
The share of accidents occurring in institutional area in the total accidents is lower than expected. It may be explained in terms of better enforcement of traffic rules in residential, institutional and commercial areas. Open areas, normally,

would be expected to have a lower enforcement presence, thereby prone to dangerous driving and traffic rules violations.

Fatalities in 2021



Fatalities in 2022

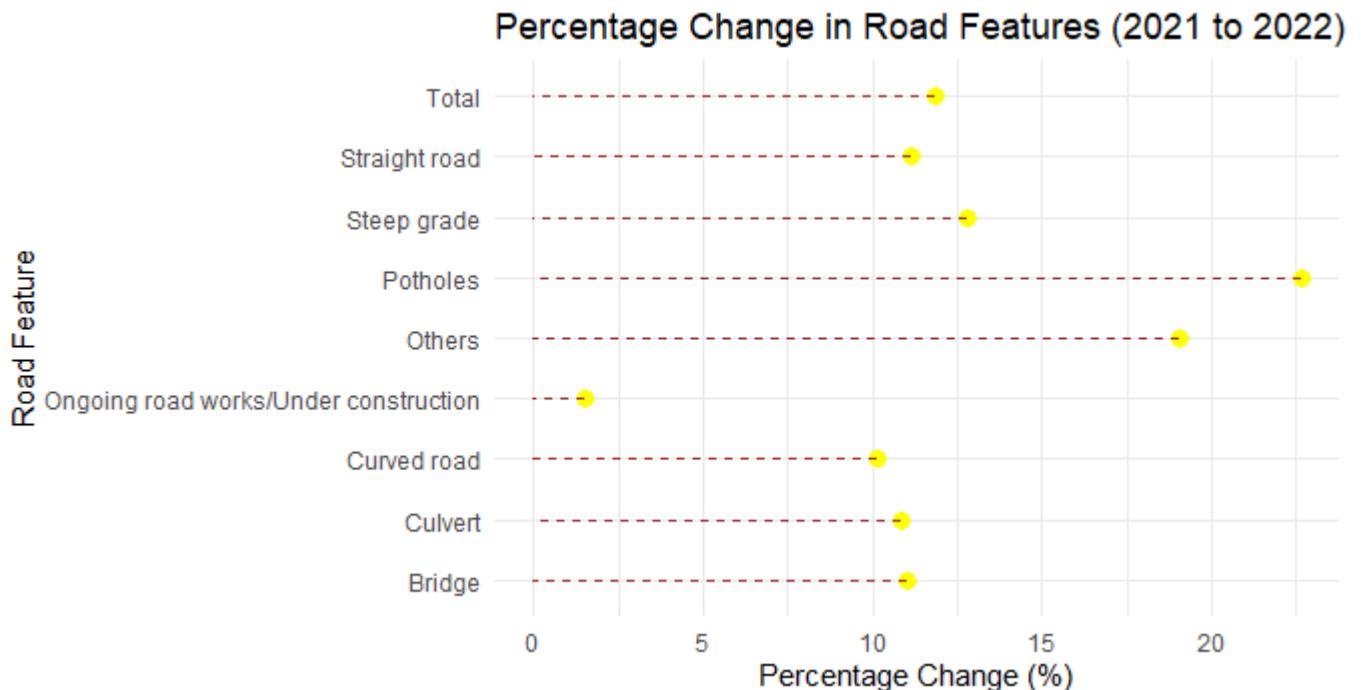


Overall Trends and Observations

- **Open Areas** are the most dangerous in terms of accidents, fatalities, and injuries, indicating high-risk factors likely due to vehicle speeds and the nature of traffic flow.
- **Residential and Market/Commercial Areas** show an increasing trend in accidents, fatalities, and injuries from 2021 to 2022. This increase may reflect urbanization, growing vehicle numbers, or other socio-economic factors driving up local road interactions.
- **Institutional Areas** have the lowest share across all categories, likely due to less traffic or regulated environments within these zones

SUGGESTIONS: THIS TREND SUGGESTS THAT TARGETED ROAD SAFETY POLICIES FOR OPEN AREAS COULD SUBSTANTIALLY IMPACT OVERALL ACCIDENT AND INJURY RATES.

ROAD ACCIDENTS CLASSIFIED BY ROAD FEATURES



- 67.0%: percentage of accidents that occurred on straight roads
- 13.8%: percentage of accidents that occurred on curved roads, pothole roads, and steep grades combined
- 66-67%: range of percentage of road accidents, persons killed, and injured on straight roads
- 2.0%: percentage of total accidents that occurred on road sections under construction

SUGGESTION:

The data, however, suggests that road safety measures must not be ignored in even straight road stretches which are normally considered to be less risky

MA ECO - RStudio

```

File Edit Code View Plots Session Build Debug Profile Tools Help
File Project.R MA.R seta.R R data sets table6 table5 dev preeti.R data1 Source Run Source
100 # Load data
101 data <- read.csv("Road_Accidents.csv")
102 Road_feature = c("Straight road", "Curved road", "Bridge", "culvert",
103   "Potholes", "Steep grade", "Ongoing road works/under construction", "other"
104   '2021' = c(278218, 49581, 12709, 6663, 3625, 3967, 9075, 48594, 412432),
105   '2022' = c(309247, 54593, 14111, 7384, 4446, 4475, 9211, 57845, 461312))
106
107 # Calculate percentage change
108 data <- data %>%
109   mutate(
110     "%age_change" = ((`2022` - `2021`) / `2021`) * 100)
111
112 # Display the data with percentage change
113 print(data)
114
115 # If you want to create a bar plot of the percentage changes
116 ggplot(data, aes(x = Road_feature, y = `%age_change`)) +
117   geom_bar(stat = "identity") +
118   coord_flip() +
119   labs(title = "Percentage Change in Road Features (2021 to 2022)",
120       x = "Road Feature",
121       y = "Percentage Change (%)") +
122   theme_minimal()
123
124 # Create a dot plot
125 ggplot(data, aes(x = Road_feature, y = `%age_change`)) +
126   geom_point(size = 3, color = "#FFFF00") +
127   geom_segment(aes(xend = Road_feature, yend = 0), color = "#A52A2A", linetype = "dashed") +
128   coord_flip() +
129   labs(title = "Percentage Change in Road Features (2021 to 2022)",
130       x = "Road Feature",
131       y = "Percentage Change (%)") +
132   theme_minimal()
133
134
135
136
137
138
139 <

```

MA ECO

Environment History Connections Tutorial

Files Plots Packages Help Viewer Presentation

Percentage Change in Road Features

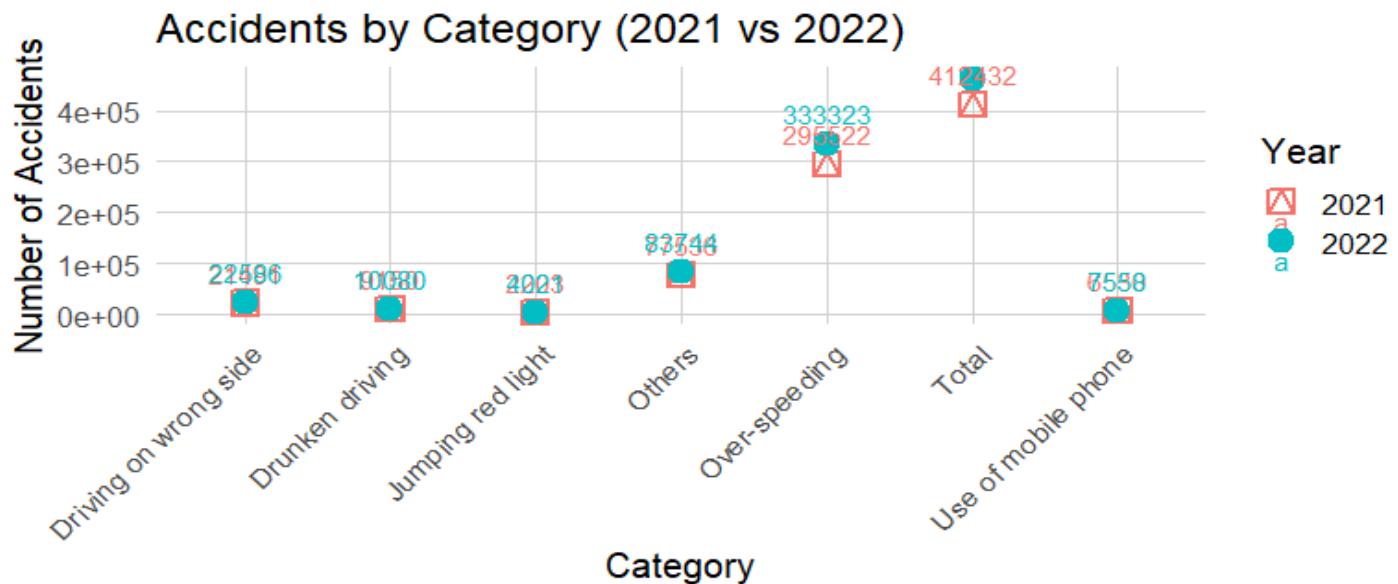
CAUSES OF ROAD ACCIDENTS

1. HUMAN ERROR

Accidents caused by human error includes

- (i) traffic rule violations
- (ii) driving without valid driver license and non-use of safety devices.

ACCIDENTS BY TYPE OF TRAFFIC RULES VIOLATION DURING 2022



Over Speeding:

- 72.3%: percentage of total road accidents
- 71.2%: percentage of total deaths
- 12.8%: increase in accidents due to over speeding (2022 vs 2021)

Other Violations:

- 7.4%: percentage of total accidents due to drunken driving, jumping red light, and mobile phone use
- 8.3%: percentage of total deaths due to drunken driving, jumping red light, and mobile phone use

Driving on Wrong Side:

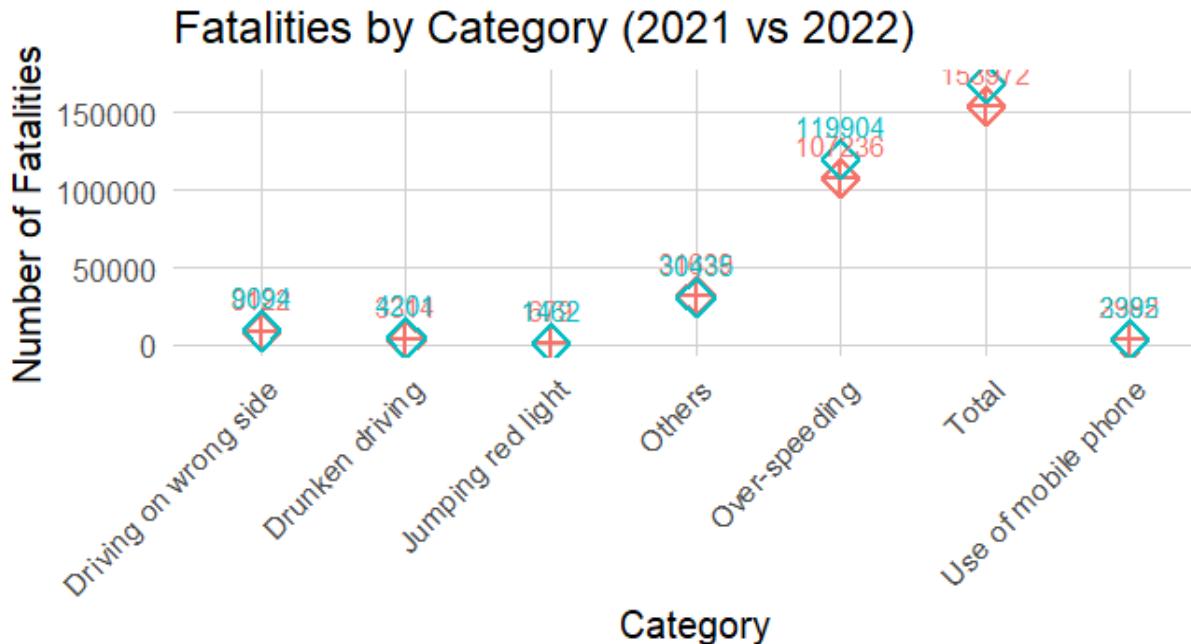
- 4.9%: percentage of total road accidents

Other Violations:

- 7.4%: percentage of total accidents due to drunken driving, jumping red light, and mobile phone use
- 8.3%: percentage of total deaths due to drunken driving, jumping red light, and mobile phone use

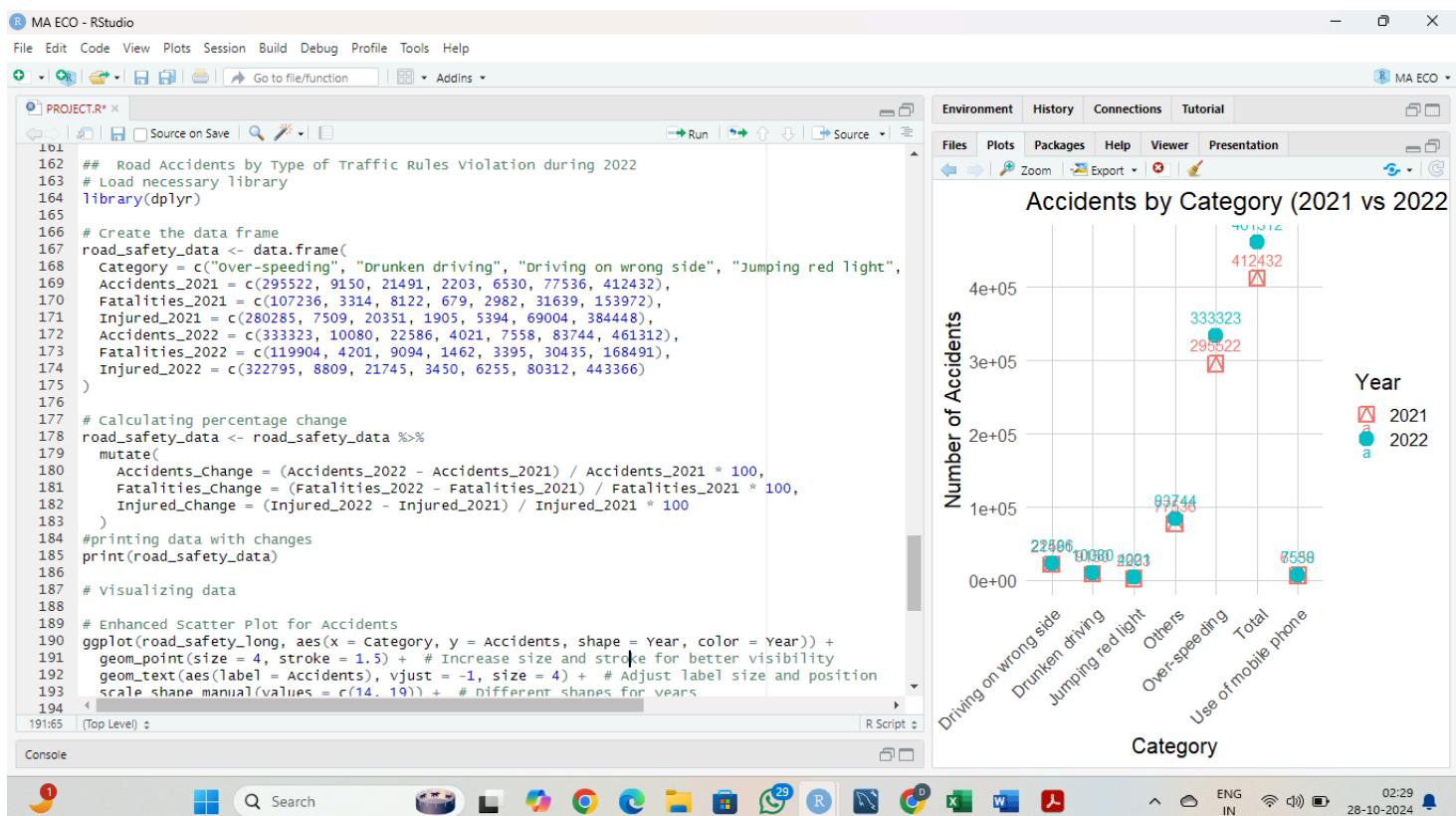
Others Category:

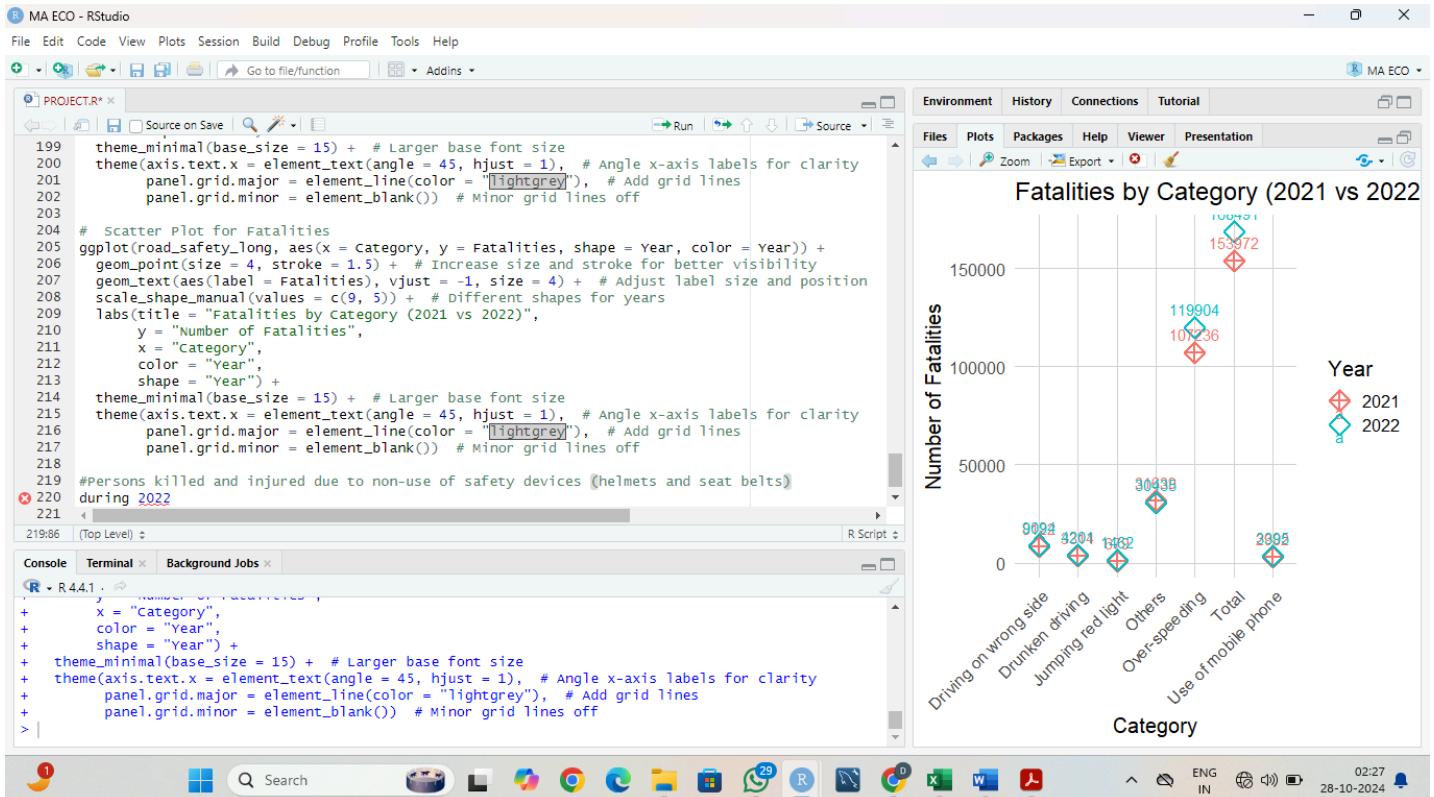
- 18.2%: percentage of total accidents
- 18.1%: percentage of total fatalities



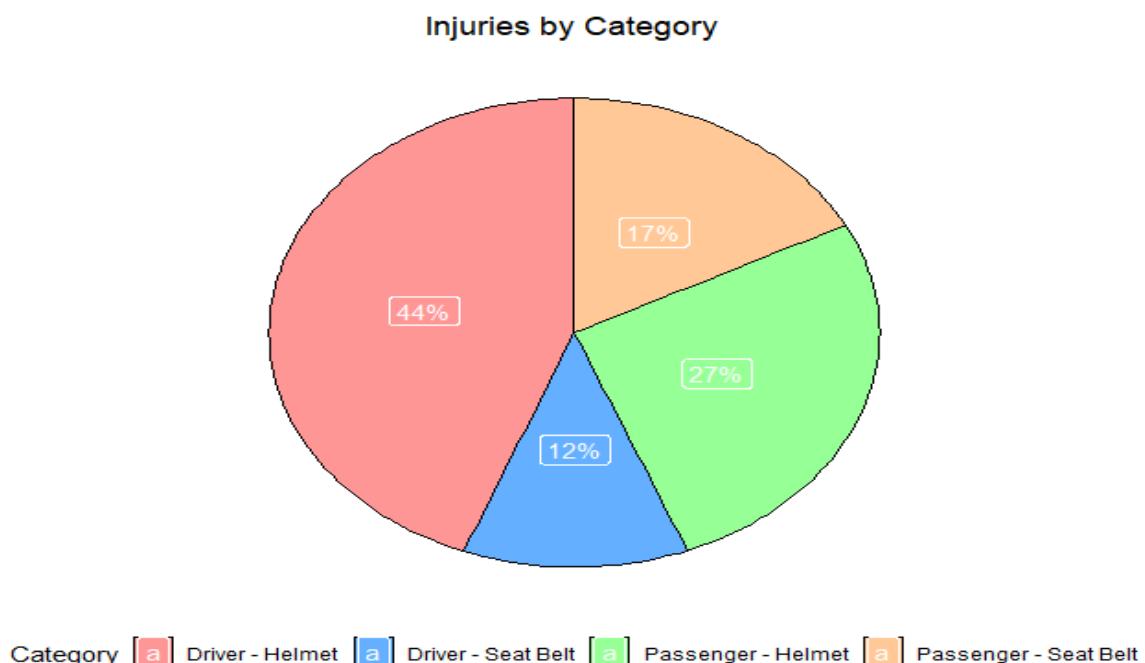
Observations

- Over-speeding remains the leading cause of accidents and fatalities.
- Significant increases were noted in fatalities and injuries from drunken driving, jumping red lights, and mobile phone usage.
- While there was an increase in overall accidents, the category "Others" saw a decrease in fatalities, which indicates some progress in road safety.

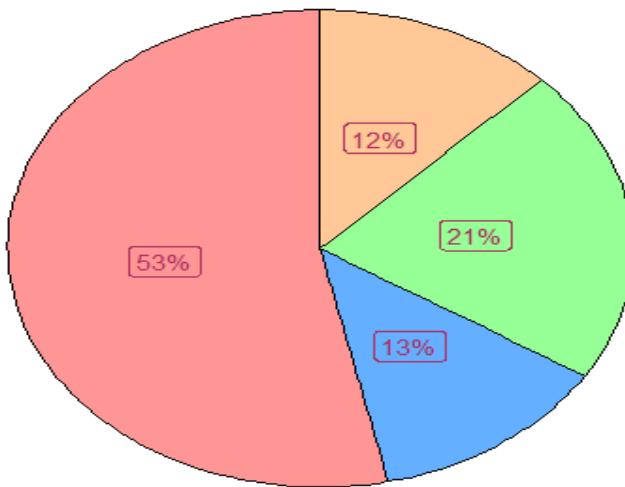




2. PERSONS KILLED AND INJURED DUE TO NON-USE OF SAFETY DEVICES (HELMETS AND SEAT BELTS) DURING 2022



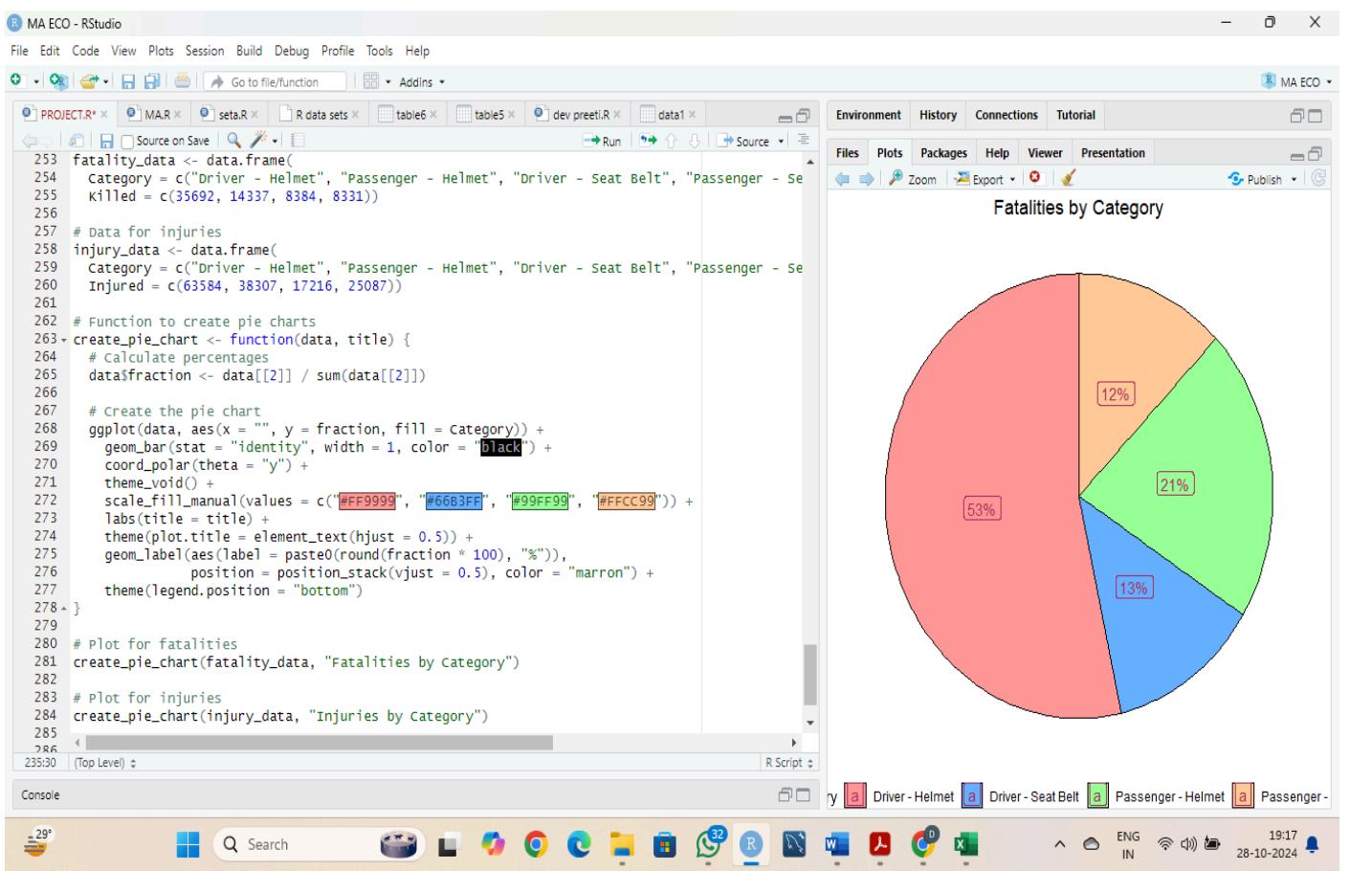
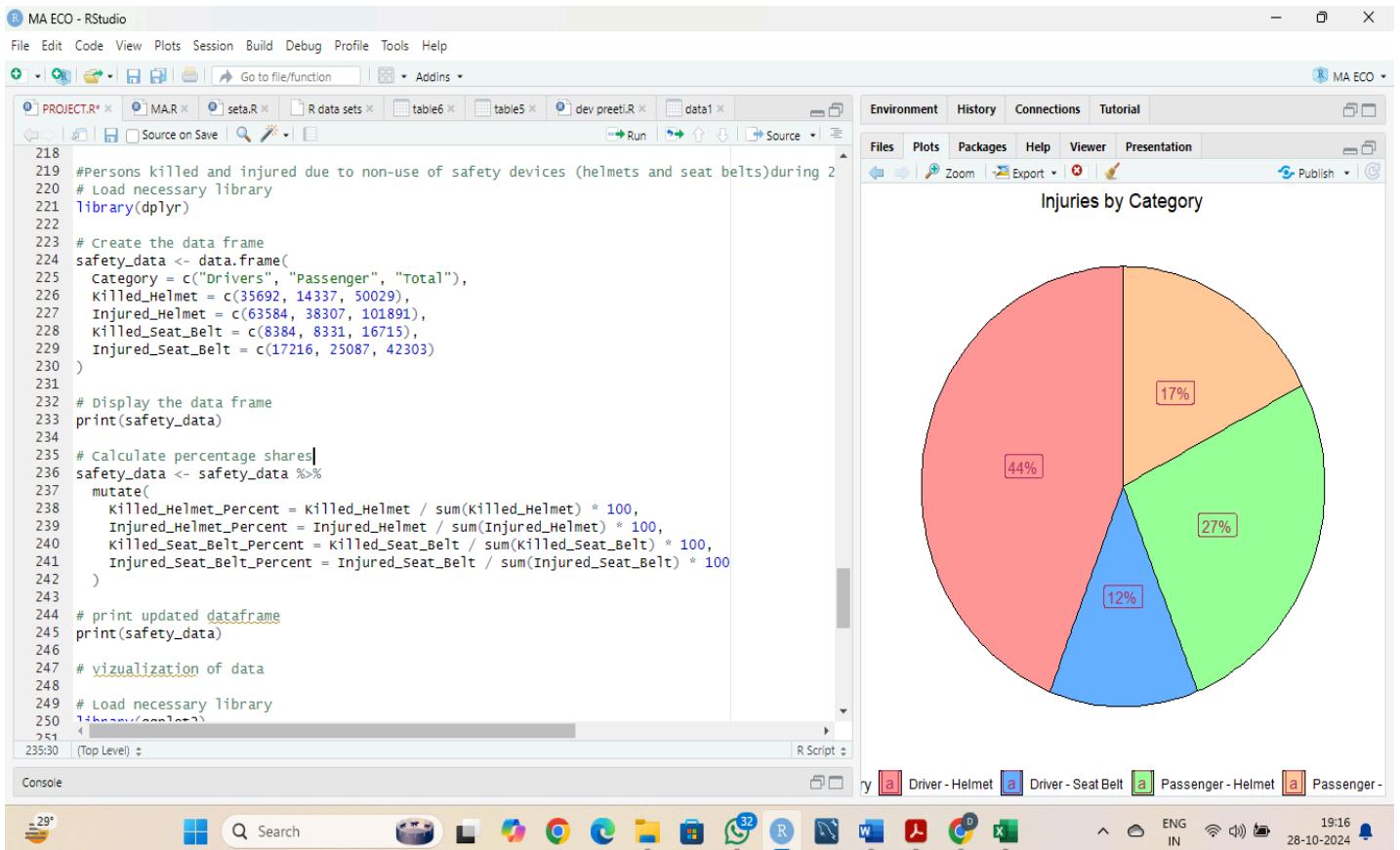
Fatalities by Category



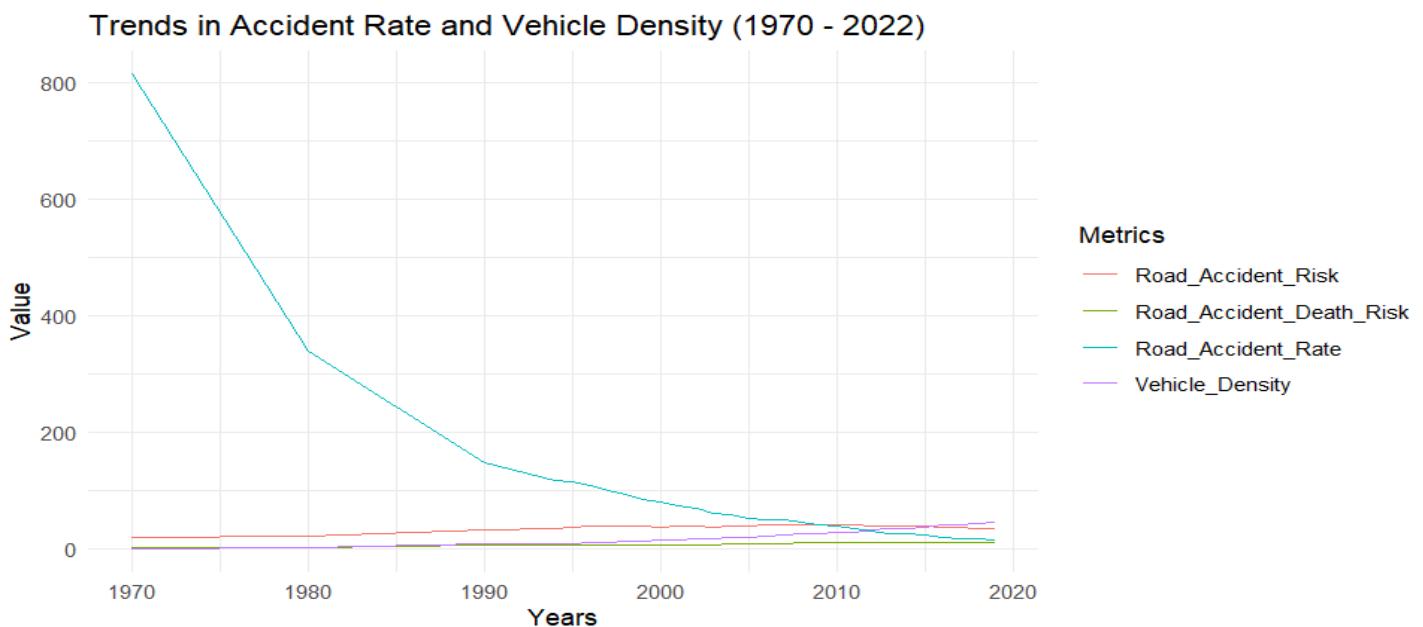
Category [a] Driver - Helmet [a] Driver - Seat Belt [a] Passenger - Helmet [a] Passenger - Seat Belt

KEY INSIGHTS:

- ❖ MOTORCYCLE RIDERS FACE GREATER INJURY RISKS FROM NON-WEARING HELMETS.
- ❖ LARGE PERCENTAGE OF FATALITIES AMONG PASSENGERS IS LINKED TO NOT WEARING SEAT BELTS.
- ❖ A SIGNIFICANTLY HIGHER NUMBER OF FATALITIES AND INJURIES ARE ASSOCIATED WITH NON-WEARING OF HELMETS COMPARED TO SEAT BELTS.
- ❖ DRIVERS ARE AT A GREATER RISK FOR BOTH HELMETS AND SEAT BELTS, BUT THE PERCENTAGES DIFFER BETWEEN CATEGORIES.



INDICATORS OF ACCIDENTS AND ACCIDENT RELATED DEATHS OVER THE YEARS NORMALIZED BY THE POPULATION AND NUMBER OF VEHICLES (1970 – 2022)



(#) Road Accident Rate: Number of Accidents Per Ten Thousand Vehicles

(##) Road Accident death rate: Number of Persons killed Per Ten Thousand Vehicles

(\$\$) Vehicle Density: Number of Vehicles per Km of Road

Estimated vechile density and predicted risk used to pedict the accident risk

(%) "Predicted risk" represents the predicted No. of road accidents per 100000 people

The figure shows the RStudio interface with the following details:

- Code Editor:** Displays R code for creating a data frame and performing linear regression. The code includes variables for Years, Population, Road_Accident_Risk, Road_Accident_Death_Risk, Total_Vehicles, Road_Accident_Rate, and Vehicle_Density.
- Environment Tab:** Shows the variables defined in the workspace: Road_Accident_Risk, Road_Accident_Death_Risk, Road_Accident_Rate, and Vehicle_Density.
- Plots Tab:** A line chart titled "Trends in Accident Rate and Vehicle Density (1970 - 2022)" plots the four metrics over time (Years). The Y-axis is labeled "Value" and ranges from 0 to 800. The X-axis is labeled "Years" and ranges from 1970 to 2020. The legend indicates:
 - Road_Accident_Risk (red line)
 - Road_Accident_Death_Risk (green line)
 - Road_Accident_Rate (cyan line)
 - Vehicle_Density (purple line)The chart shows a sharp decline in all metrics from 1970 to 1980, followed by a more gradual decline through 2020.
- Console Tab:** Displays R session output, including the regression model summary and F-statistic.

REGRESSION ANALYSIS

Regressing road accident risk on population and vehicle density

Data for the years (2020 -2022) were Removed containing rows with NA values in 'Vehicle_Density' to avoid issues in the regression

model summary

Call:

```
lm(formula = Road_Accident_Risk ~ Population + Vehicle_Density, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-3.6473	-0.6890	-0.2869	1.0719	1.9377

Coefficients:

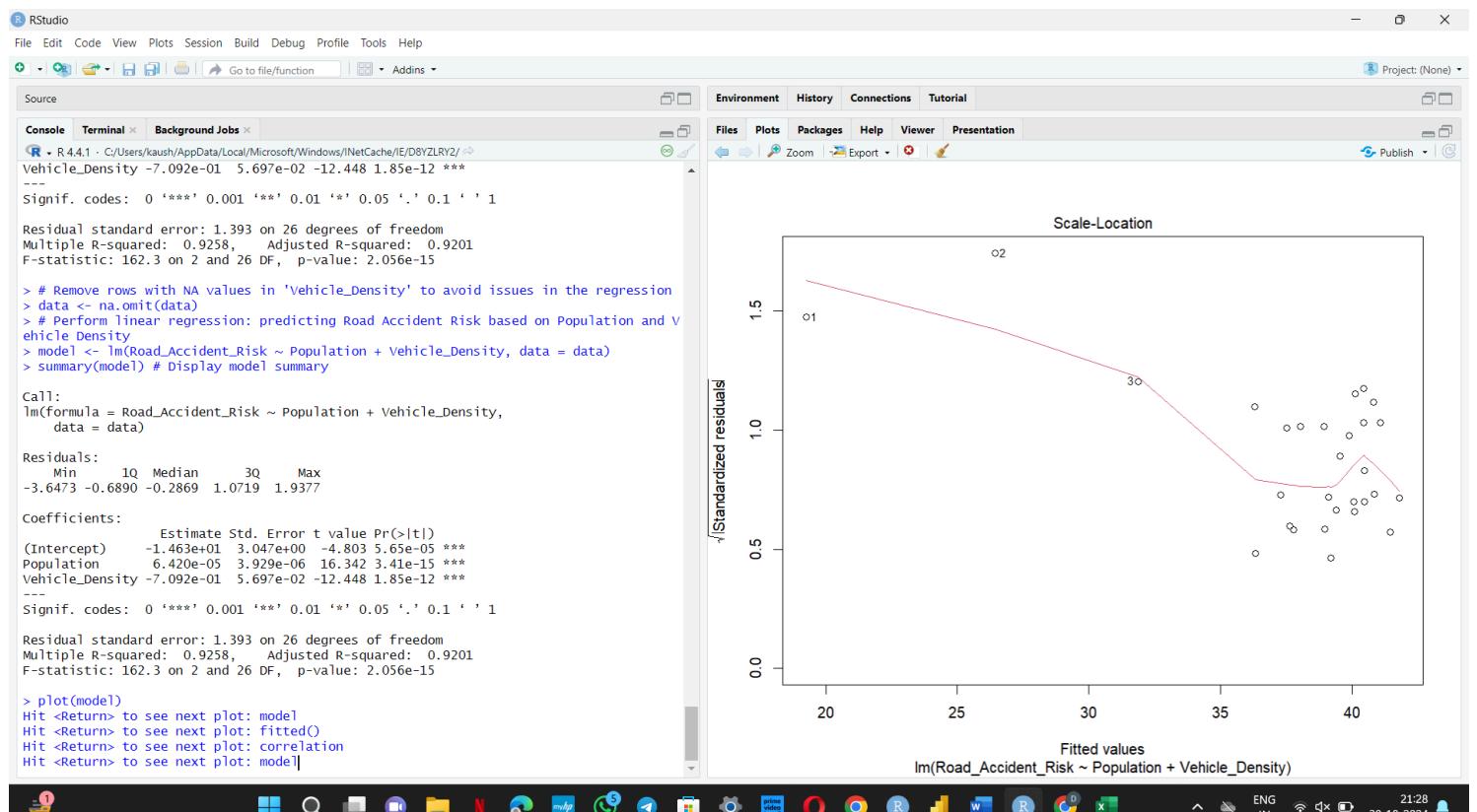
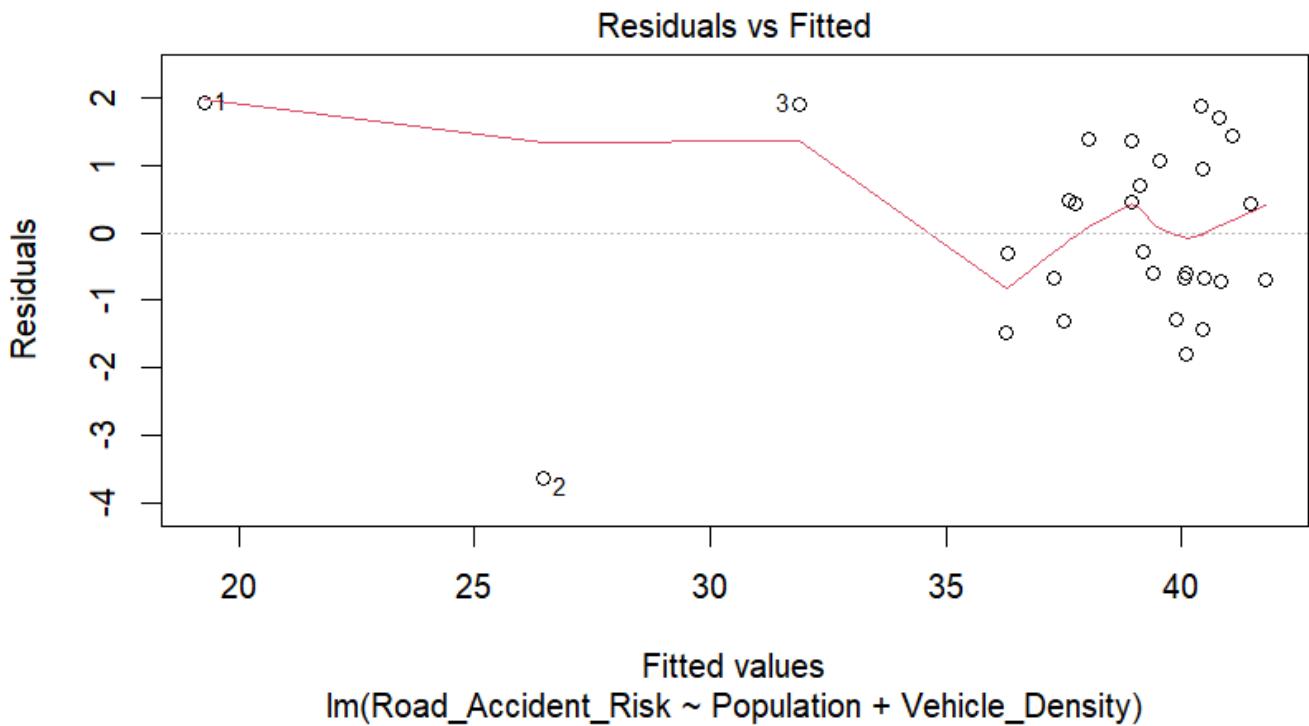
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.463e+01	3.047e+00	-4.803	5.65e-05 ***
Population	6.420e-05	3.929e-06	16.342	3.41e-15 ***
Vehicle_Density	-7.092e-01	5.697e-02	-12.448	1.85e-12 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

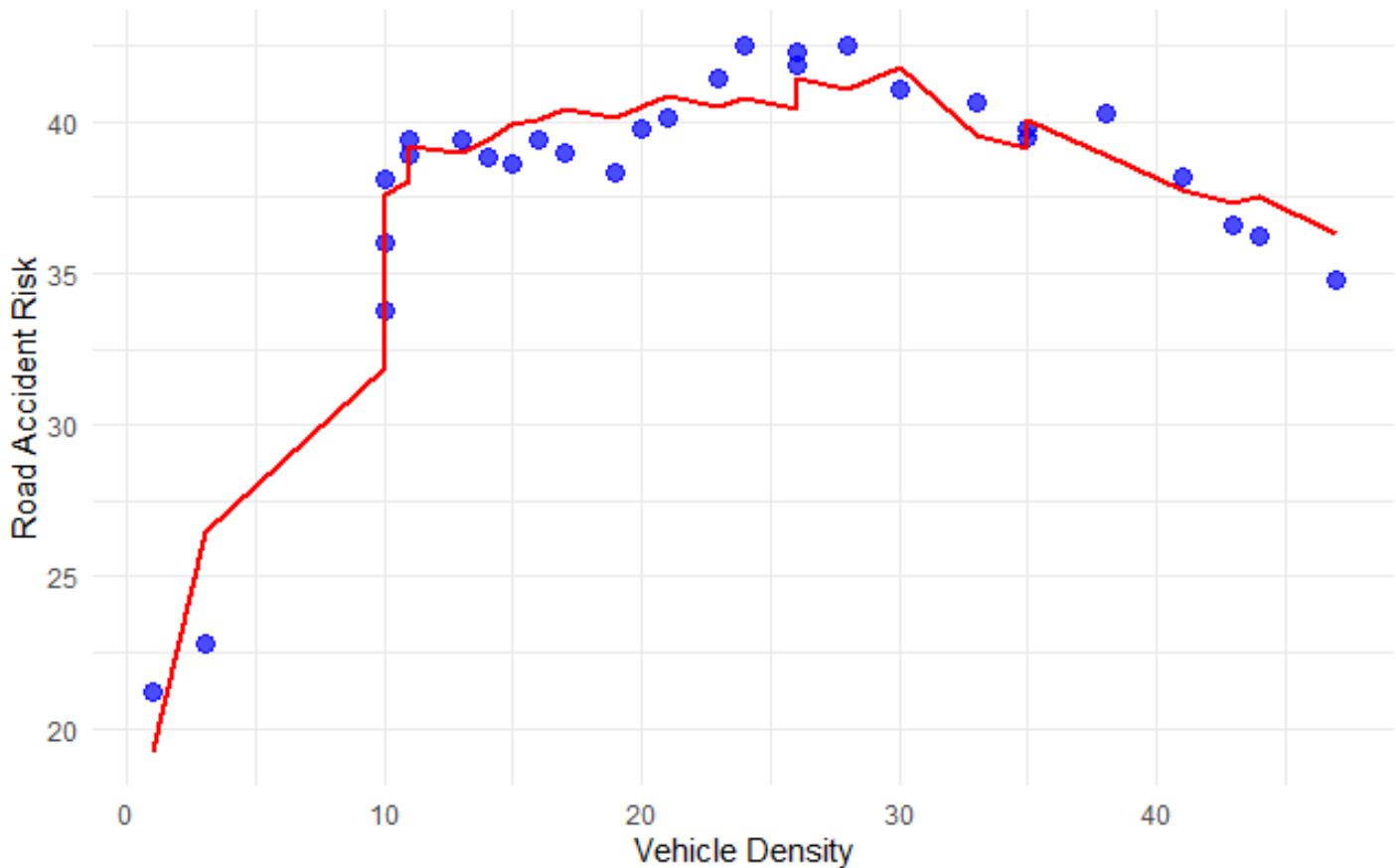
Residual standard error: 1.393 on 26 degrees of freedom

Multiple R-squared: 0.9258, Adjusted R-squared: 0.9201

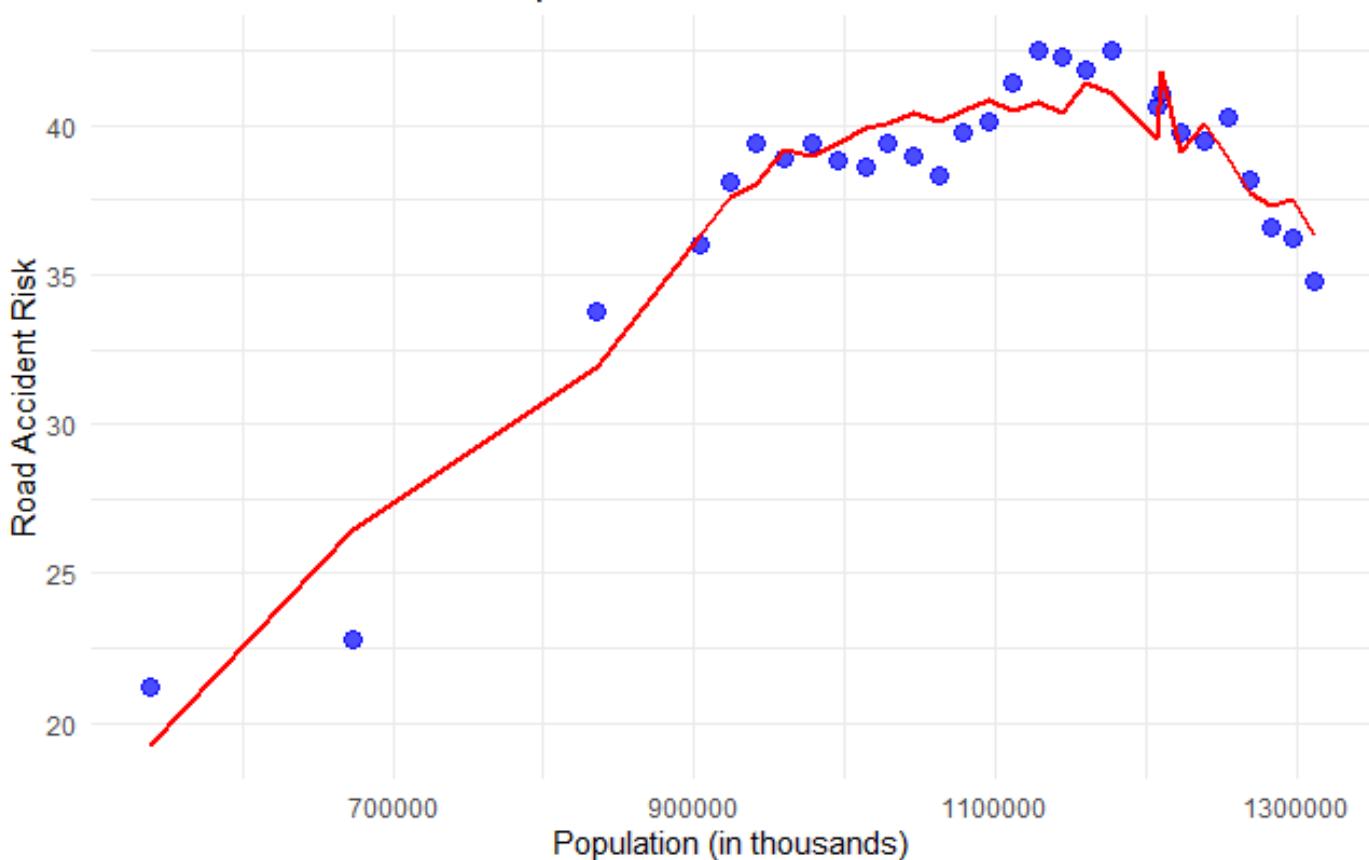
F-statistic: 162.3 on 2 and 26 DF, p-value: 2.056e-15

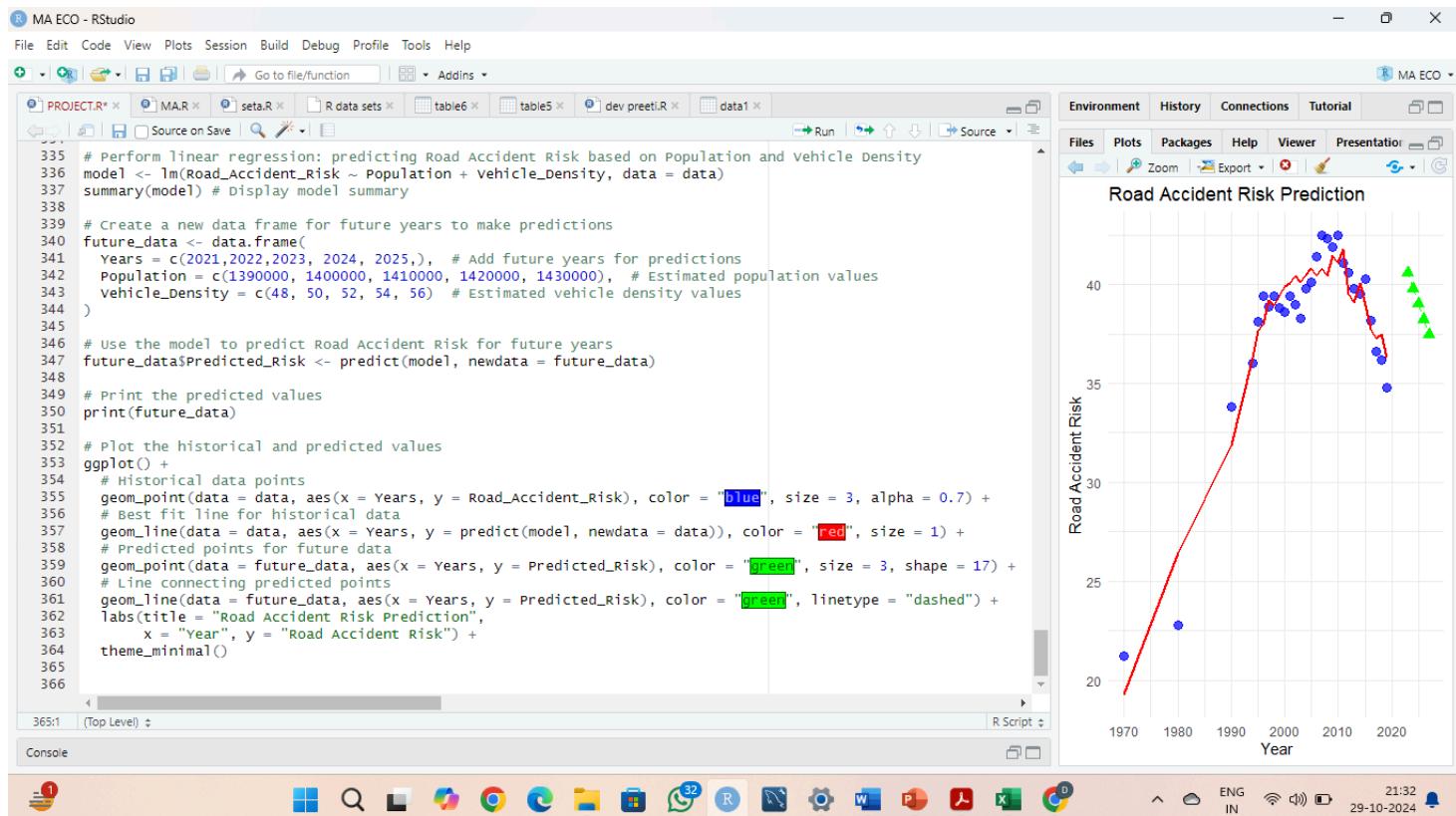
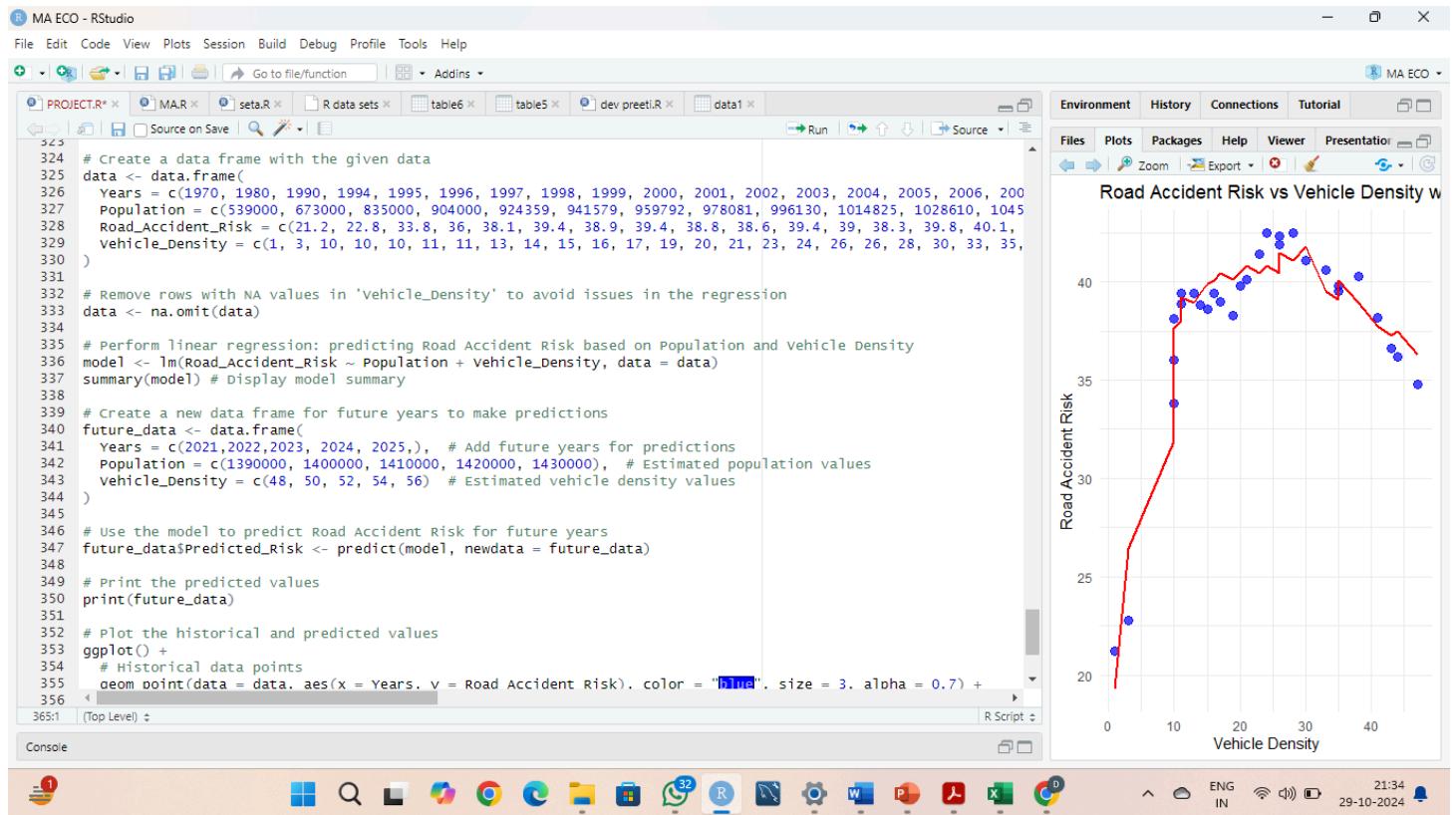


Road Accident Risk vs Vehicle Density with Best Fit Line



Road Accident Risk vs Population with Best Fit Line



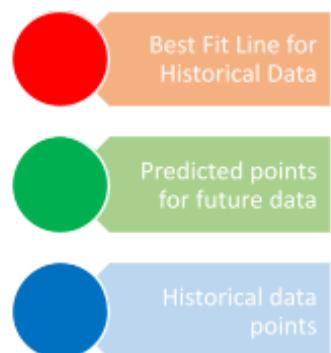
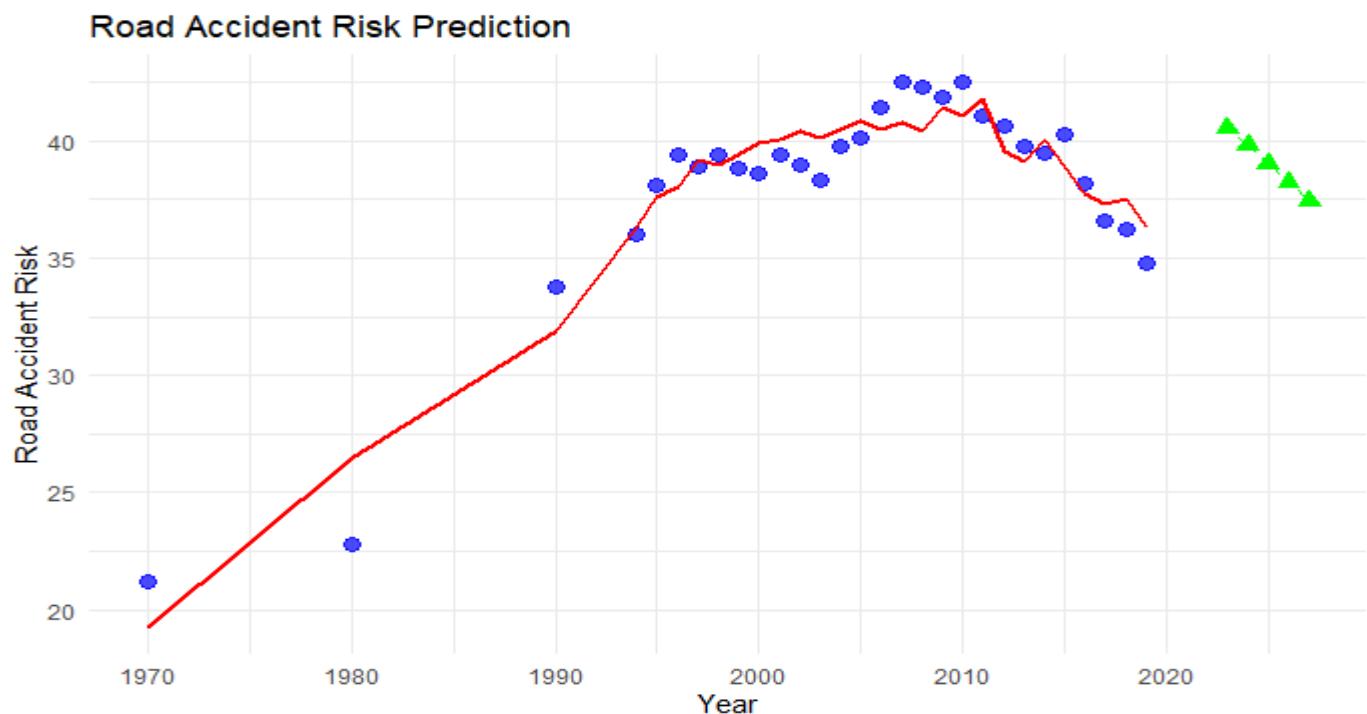


Predicted (future_data)

Years	Population	Vehicle_Density	Predicted_Risk
1	2023	1390000	48
2	2024	1400000	50
3	2025	1410000	52
4	2026	1420000	54
5	2027	1430000	56

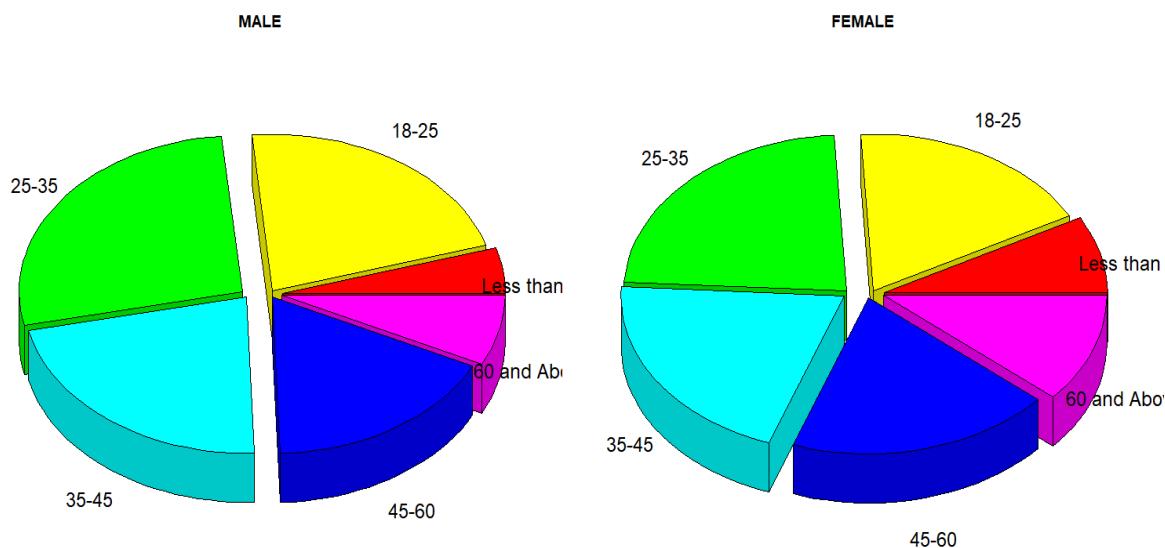
(*) Road Accident Risk: Number of Accidents per Lakh Population

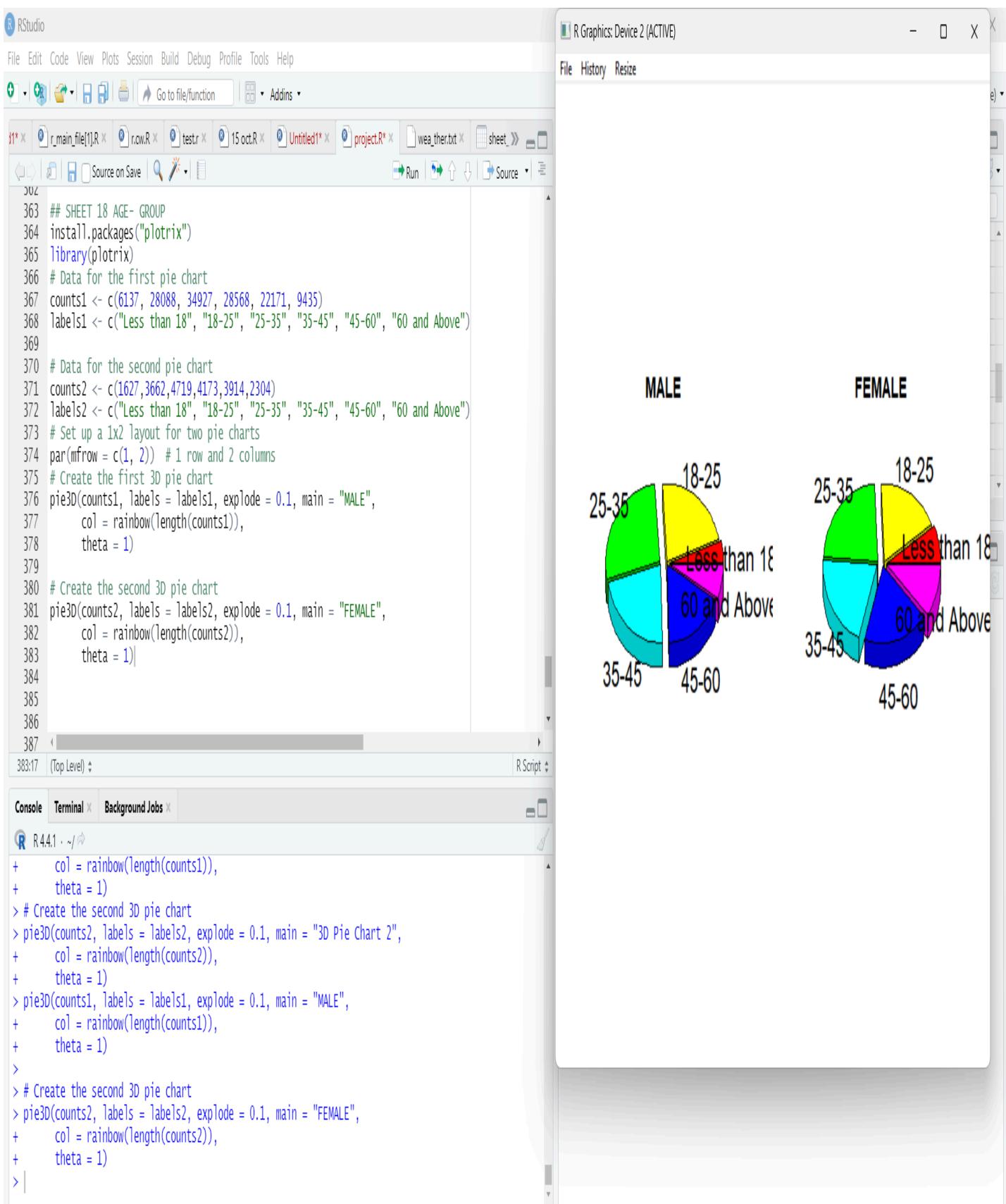
(\\$) Road Accident Death Risk: Number of Persons Killed per Lakh Population



Age profile of Fatal Road Accident victims during 2021 to 2022

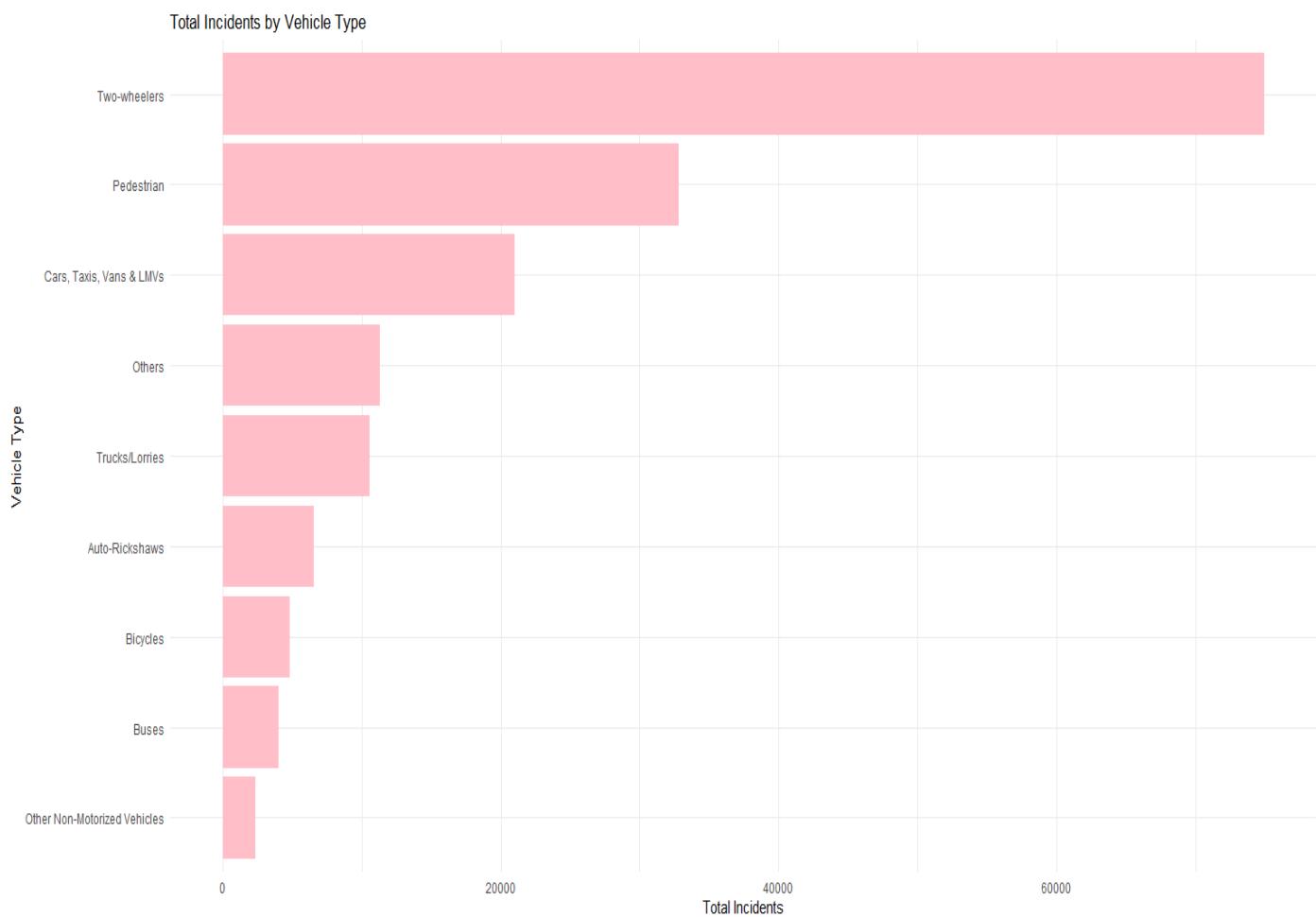
The age distribution of victims in fatal road accidents over the past two years, 2021 and 2022 indicates that a significant portion of those affected are young individuals. In 2022, individuals aged 18-45 comprised 66.5 percent of all road accident fatalities . This highlights that road accident victims are predominantly from the younger, economically active population, which has serious implications for the nation's socio-economic stability, along with emotional and psychological repercussions for families, communities, and the country as a whole. The demographic of working-age individuals from 18 to 60 years old accounted for 83.4 percent of total road accident fatalities nationwide, dividing it on the basis of gender (male, female) . The change in road fatalities for those under 18 stood at 5.7% in 2022, marking it as the lowest percentage within the age distribution.

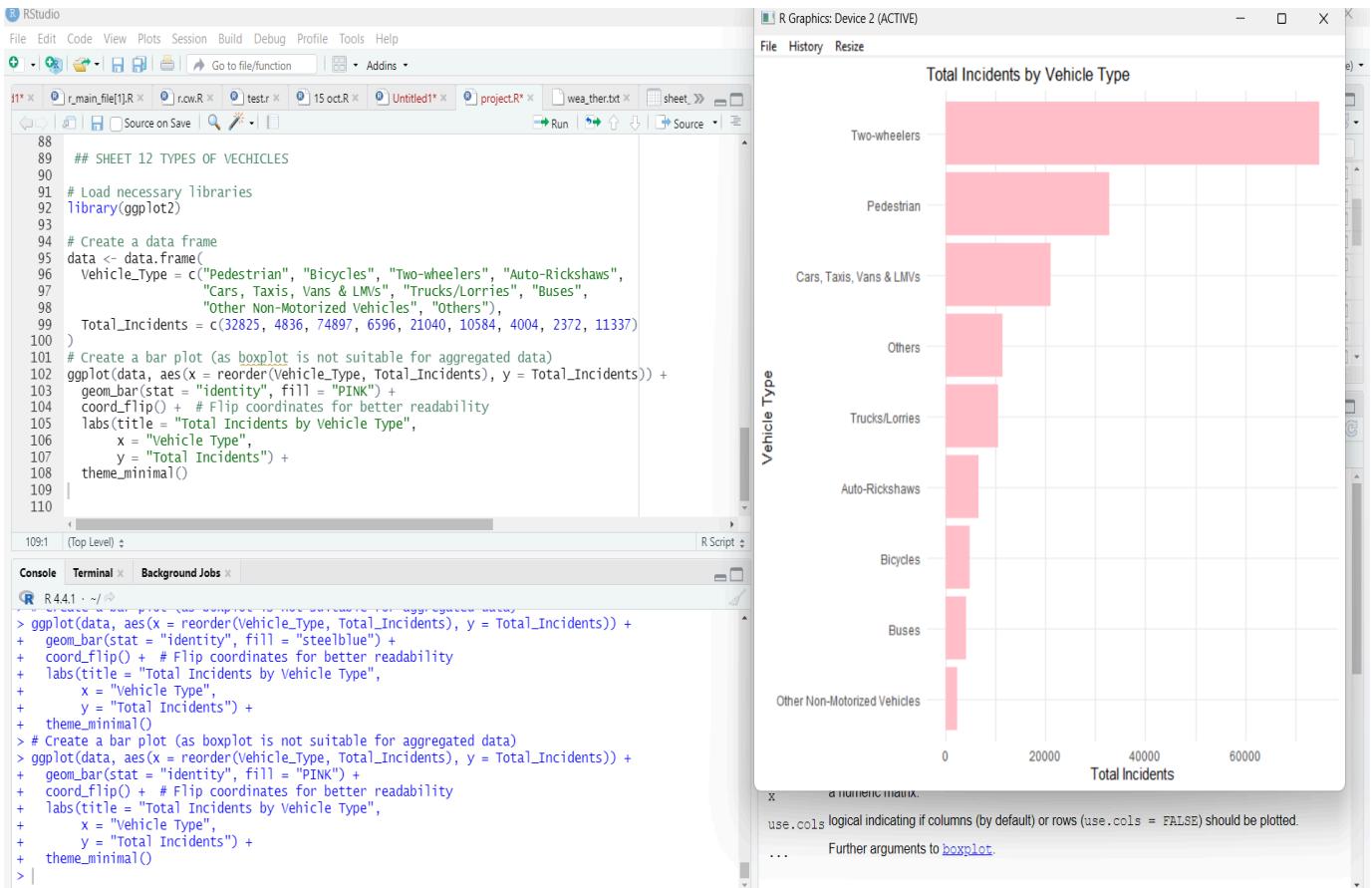




Persons killed in Accidents Classified by the type of impacting vehicles (Crime Vehicles by Victim vehicles) in 2022

In 2022, the number of pedestrians who lost their lives due to various categories of crime vehicles was 32,825, representing 19.5 percent of all road accident fatalities. The top three types of vehicles contributing to pedestrian deaths are two-wheelers (28.4%), followed by cars, taxis, and vans (24.5%). The total number of victims killed while using two-wheelers was 74,897, accounting for approximately 44.5 percent of total road accident deaths. Regarding the percentage share, the leading types of crime vehicles responsible for two-wheeler fatalities are two-wheelers (36.9%), cars, taxis, and vans (22.7%), and trucks and lorries (17.6%). It is reported that 21,040 occupants of cars, taxis, vans, and light motor vehicles (12.5 percent) were killed in 2022, with collisions involving cars, taxis, vans, and light motor vehicles being responsible for 42.5 percent of these fatalities, followed by trucks and lorries at 23.9 percent.

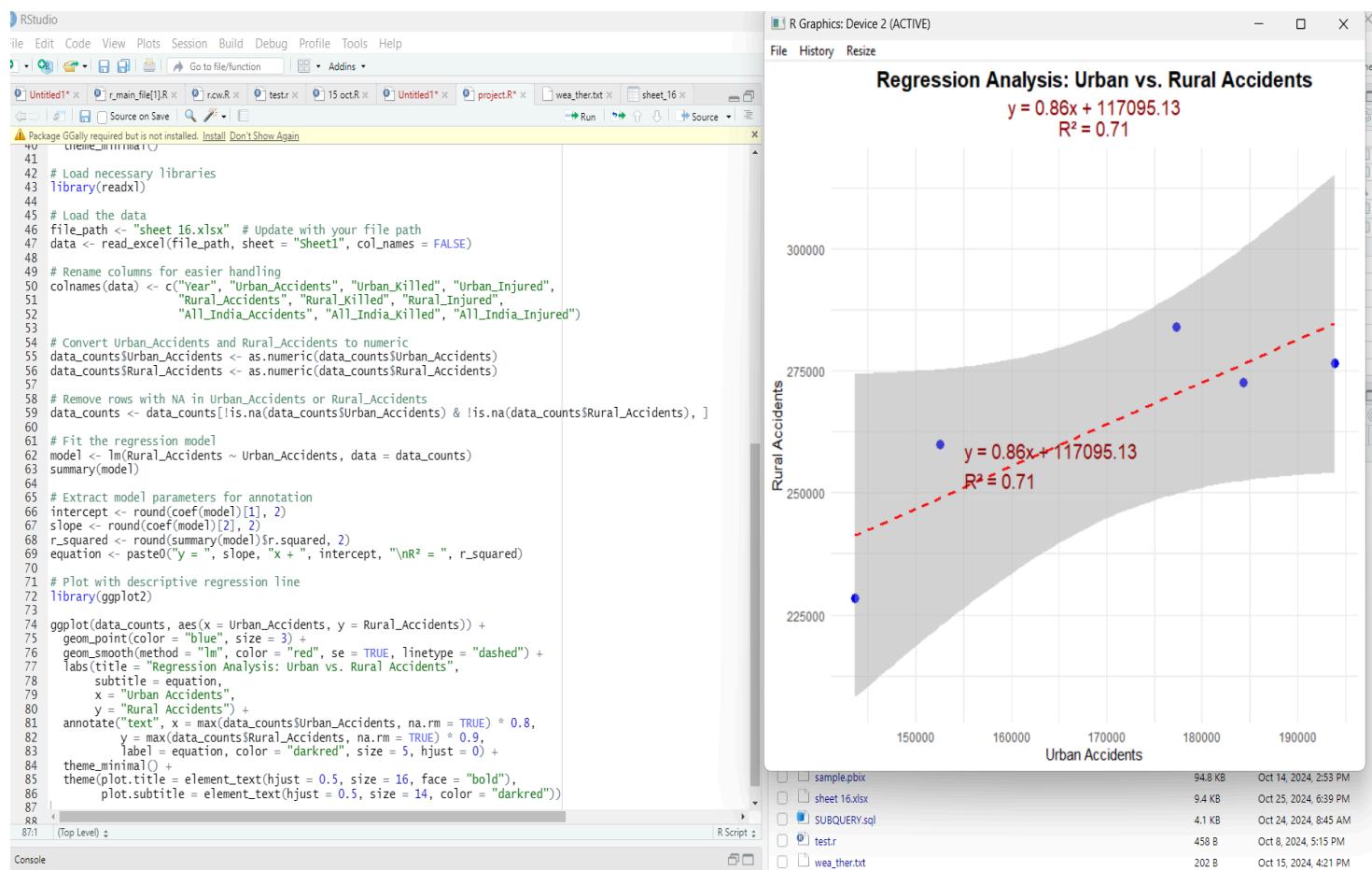
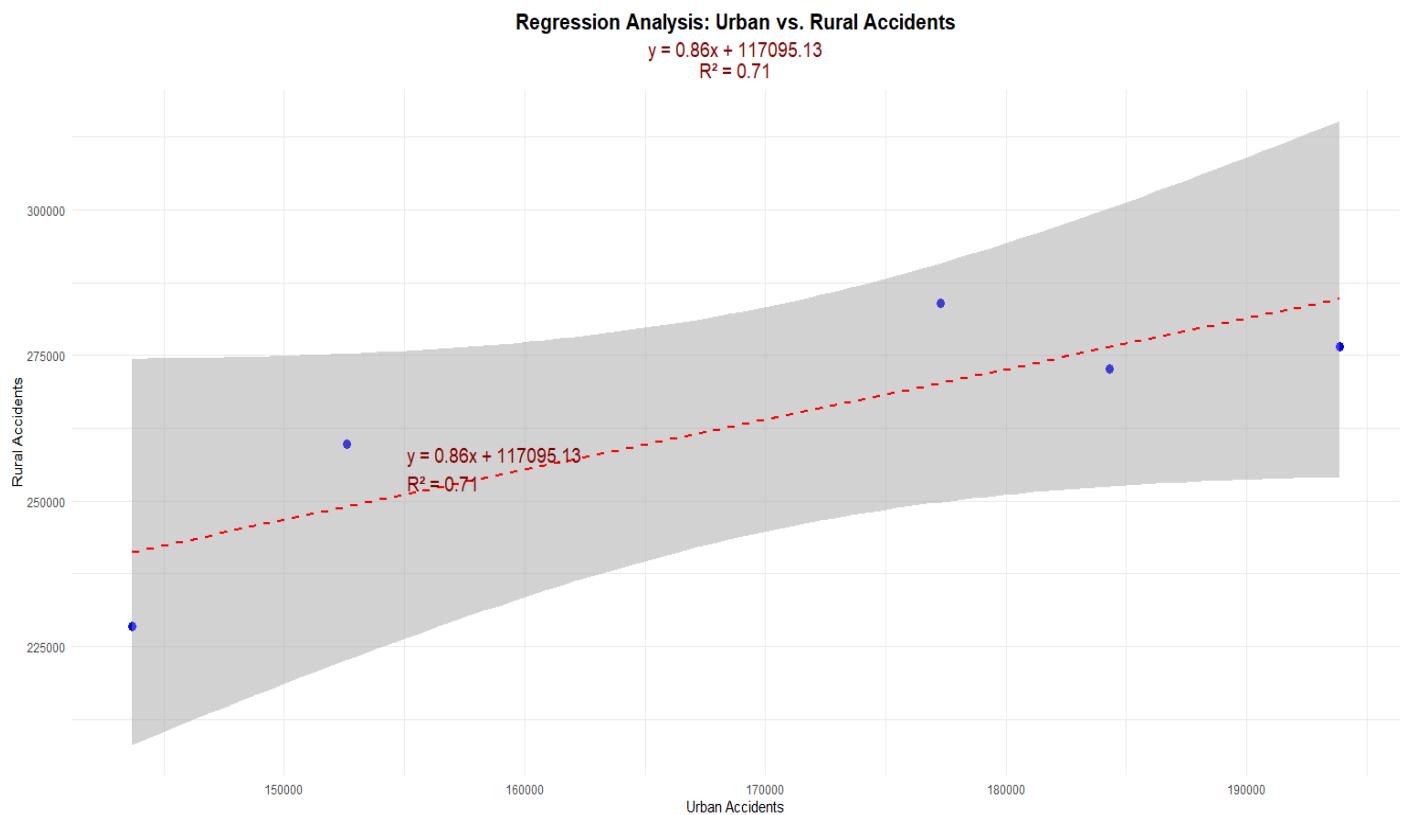




ROAD ACCIDENTS IN URBAN AND RURAL AREAS

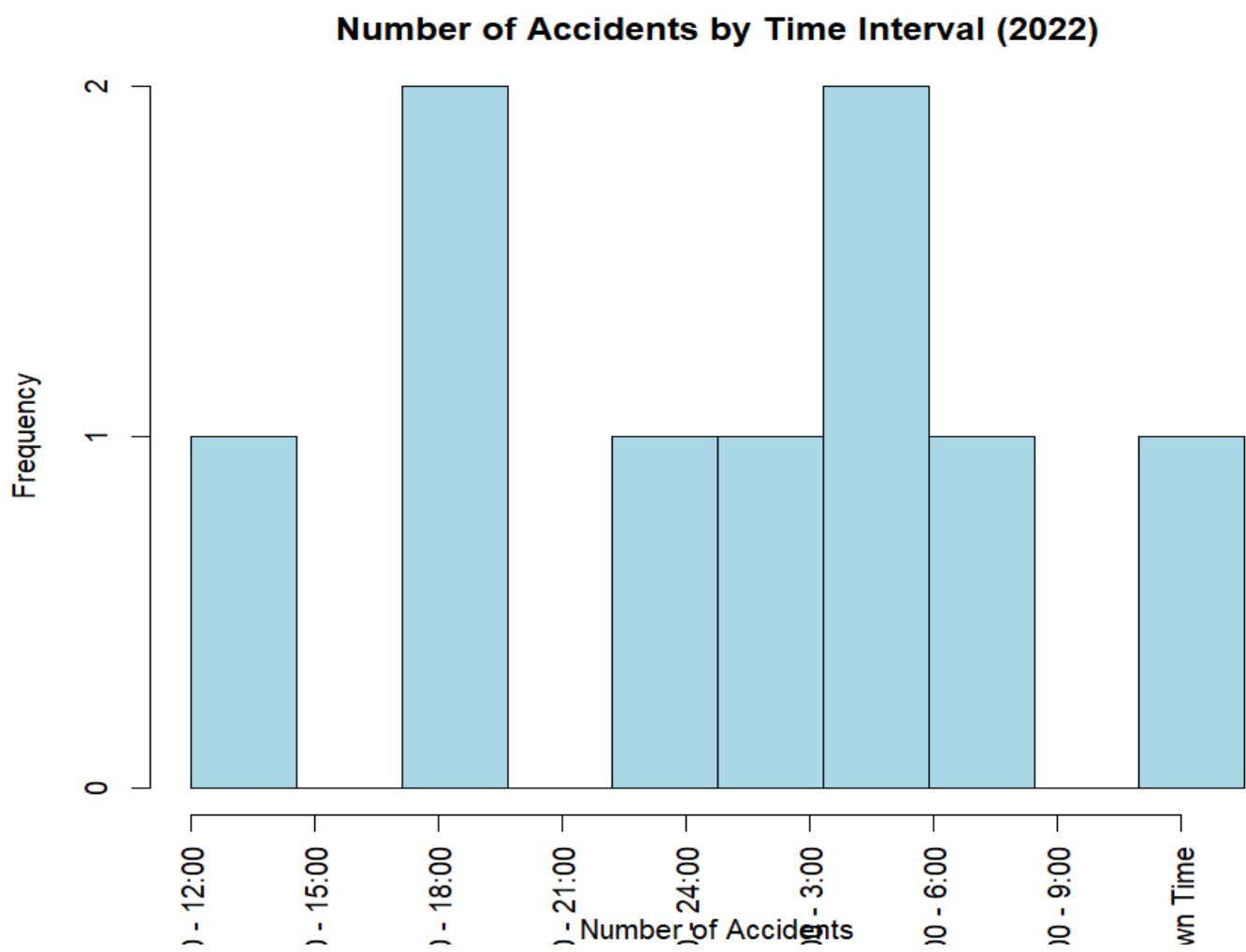
In 2022, there were 1,77,269 (38%) reported road accidents in urban settings and 2,84,043 (62%) in rural settings, resulting in injuries to 1,59,444 (36%) individuals in urban areas and 2,83,922 (64%) in rural areas. The total number of fatalities for that year was 54,230 (32%) in urban areas and 1,14,261 (68%) in rural areas. Compared to 2021, the proportion of accidents and deaths in urban areas rose in 2022, while rural areas experienced a decrease in both categories (Table 7.1). The higher percentage of fatalities in rural areas may be attributed to a lack of trauma care facilities, inadequate emergency medical services, limited enforcement of road safety regulations, and lower awareness regarding safe driving practices compared to urban areas. In 2022, the proportion of accidents and fatalities in Urban Areas rose from 37% to 38% and from 31% to 32%, respectively. However, between 2018 and 2022 (as shown in chart 7.1), both the number of accidents and fatalities in Rural Areas increased. Urban areas were responsible for 38 percent of accidents, while Rural Areas accounted for 62

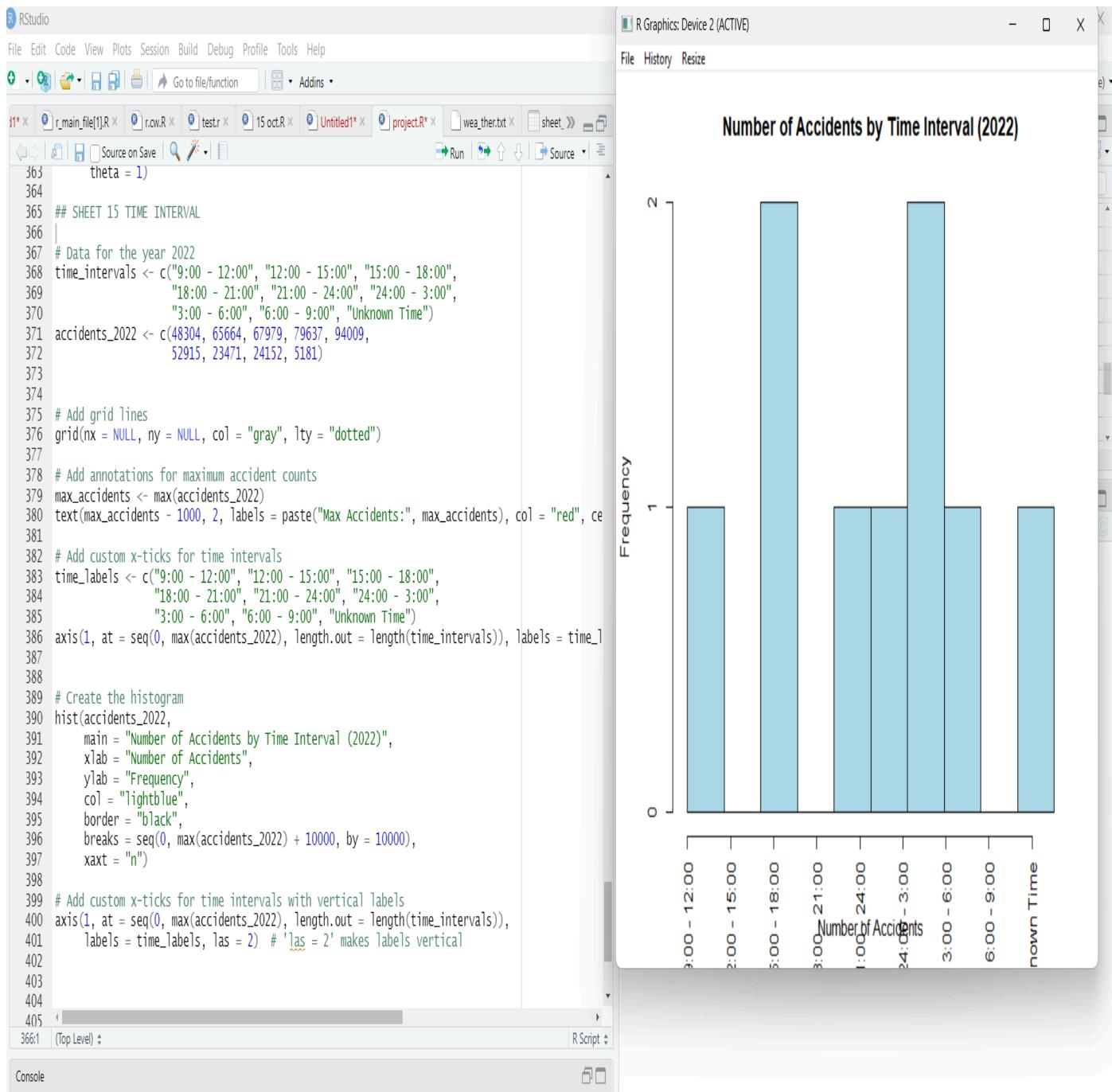
percent in 2022. Likewise, Urban Areas represented 32 percent of total fatalities, with Rural Areas making up 68 percent in the same year.



TRENDS IN TIME INTERVAL-WISE DISTRIBUTION OF ROAD ACCIDENTS

In 2022, the period from 18:00 to 21:00 hours (Night) recorded the highest number of road accidents, representing 20.4 percent of the total accidents in the country, consistent with trends observed over the past five years (Table 7.3). The second highest time period during the day was from 15:00 to 18:00 hours (Day), accounting for 17.3 percent of road accidents. According to the data, afternoon and evening hours are the most hazardous times to be driving. The time frame from 00:00 to 6:00 AM reported the fewest accidents (Table 7.3 and Chart 7.4). Detailed state-wise information on road accidents by time interval is available in data.

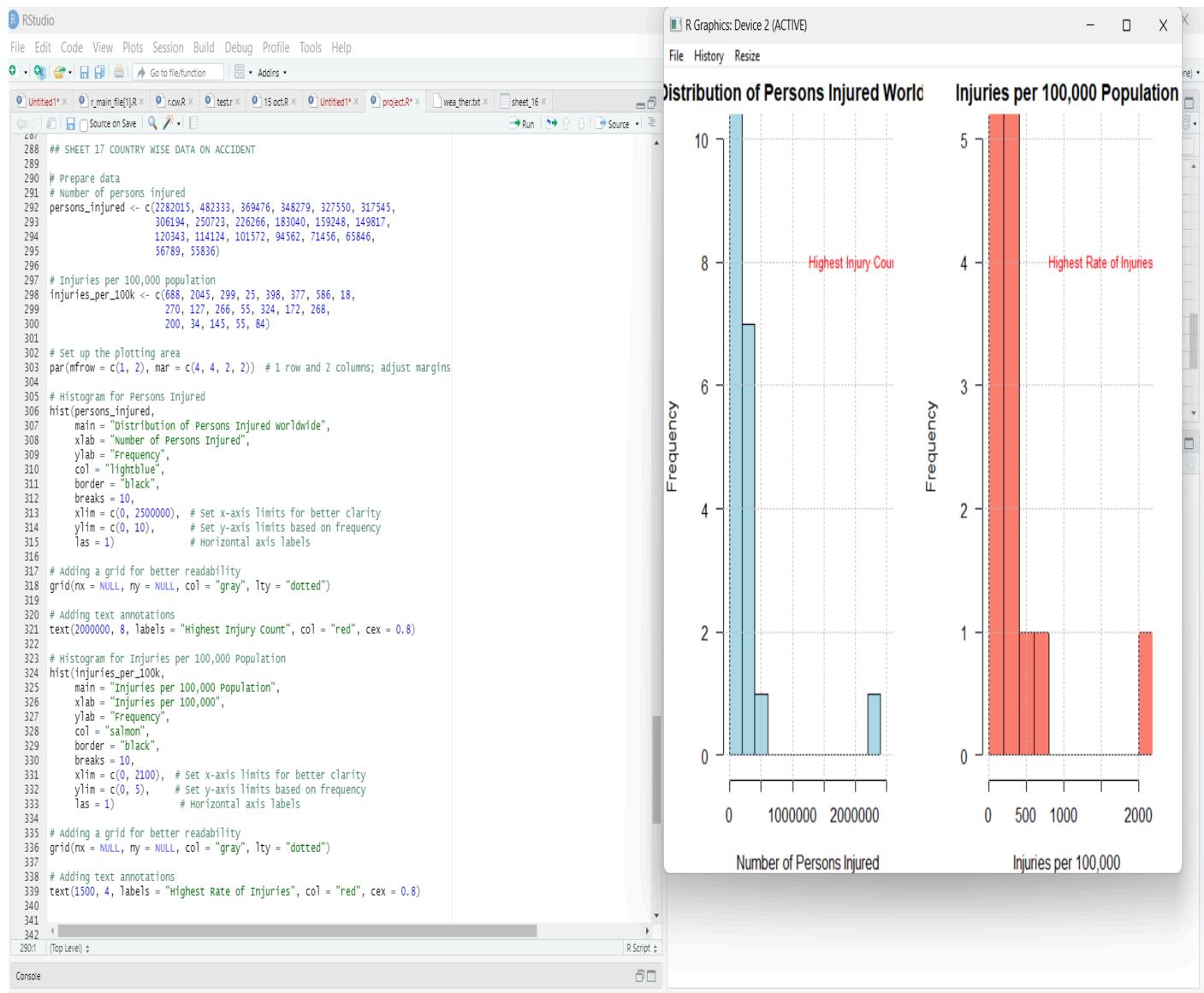




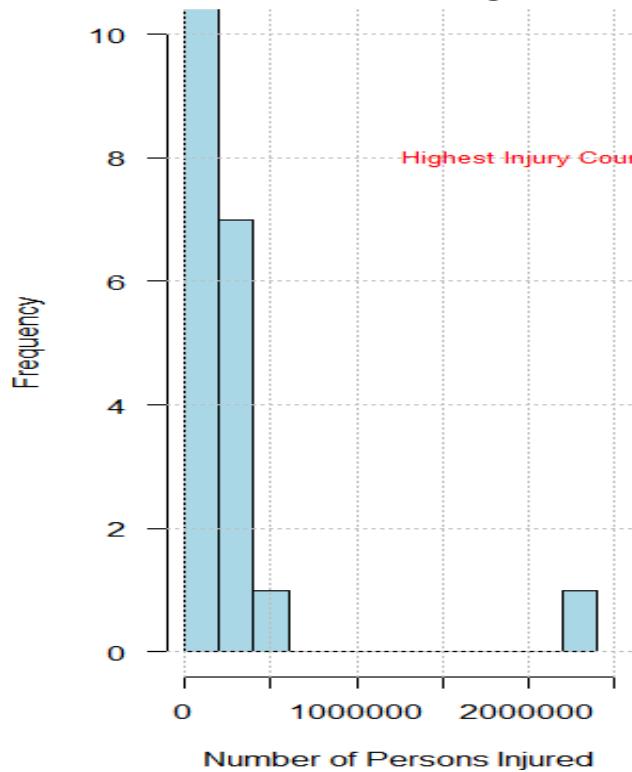
Top 20 country based on Road Injury Accidents

The largest number of injury accidents occurs in the United States. The number of injury accidents per one million people is comparatively low in nations like Brazil, Indonesia, and India.

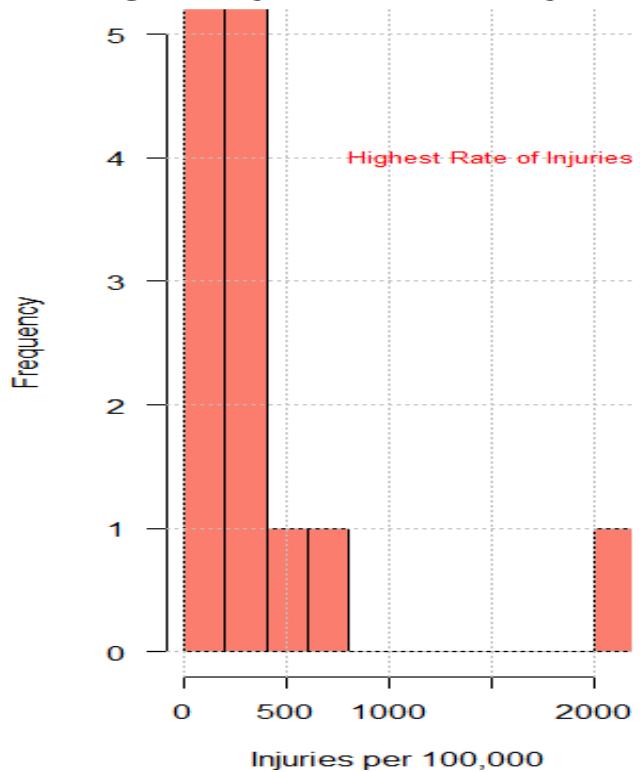
8.4 The table shows the specifics of the number of injured people (n) and the number of injured people (n) per one million people in the top 20 nations.



Distribution of Persons Injured World

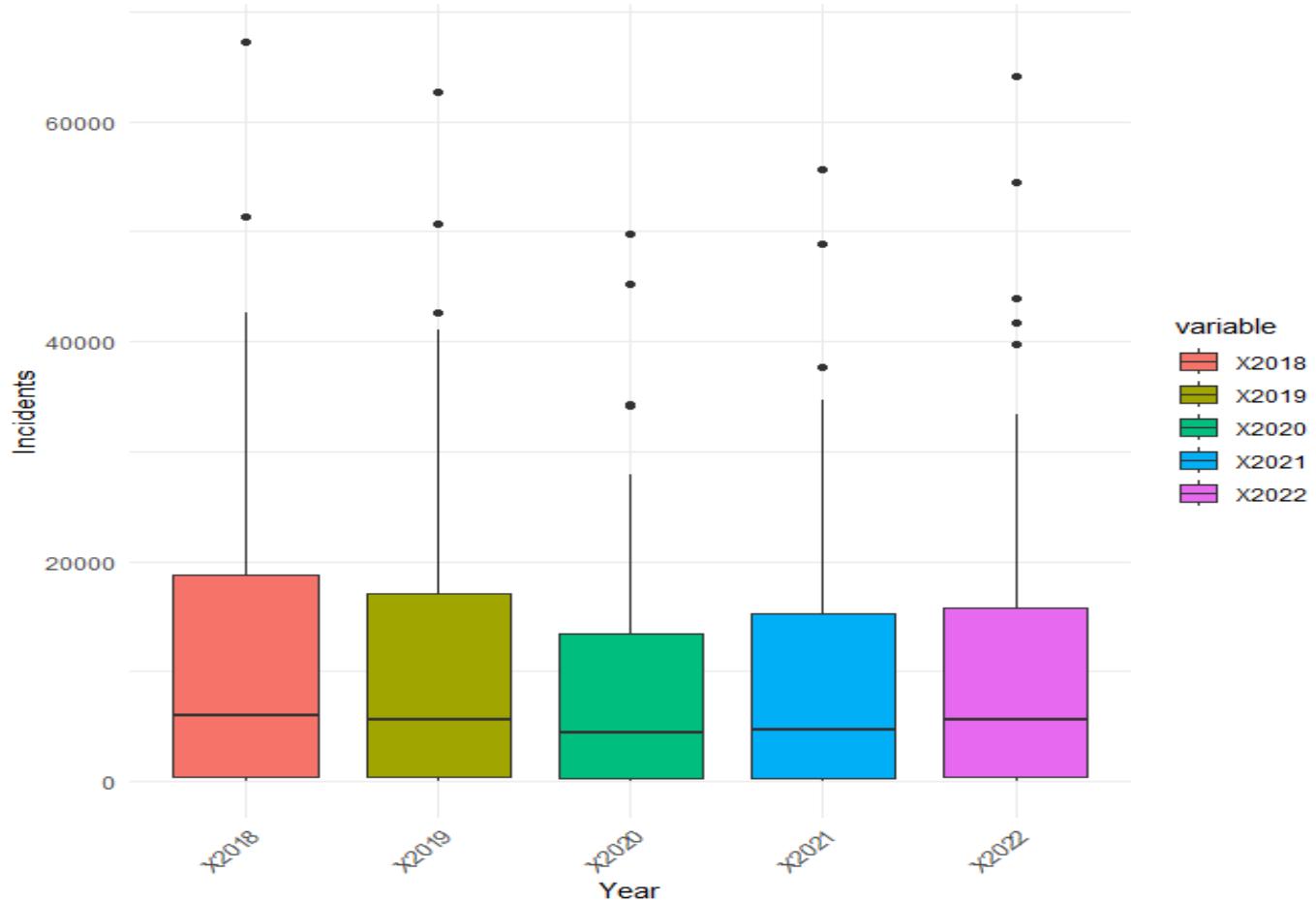


Injuries per 100,000 Population

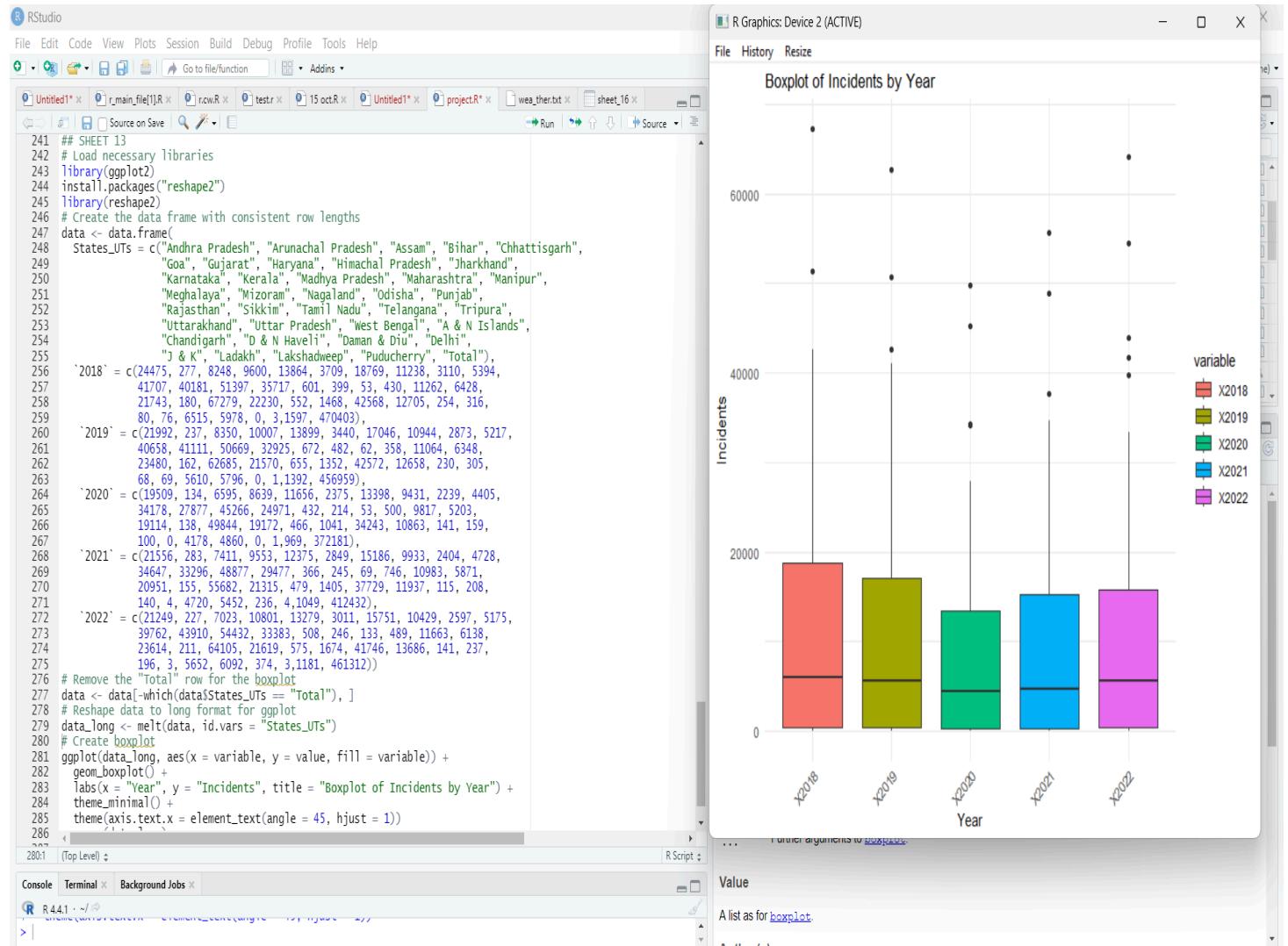


STATE-WISE PROFILE OF FATALITIES

Boxplot of Incidents by Year



The total number of accident deaths had increased from 1,53,972 in 2021 to 1,68,491 in 2022, registering an increase of 9.4 percent over the previous year. All States except Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Andaman & Nicobar and Chandigarh, recorded an increase in fatalities during 2022 compared to the same period in 2021.



thank you