EDA ANALYSIS FOR ROAD ACCIDENTS IN INDIA - 2018

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04/06/2021

```
##1. ACCIDENTS IN 2018 WITHOUT WEARING HELMET


##loading dataset
non_wearing_helmet<-read.csv("C:/Users/Tenisha/Documents/acci_data/Road-Acc
idents-2018-non wearing of helmet.csv")
#checking null values
is.null(non_wearing_helmet) %>% sum()
```

```
## [1] 0
```

```
##removing unnecessary rows and columns
##removing total rows
data1<-non_wearing_helmet[-37,]
##removing unwanted columns which contains
data2<-data1[-c(1,4,7,9,12)]
##calculating mean
apply(data22[,2:7],2,mean)
```

```
##                 Drivers...Persons.Killed...Number
##                                          784.7222
##    Drivers...Persons.Injured...Greviously.Injured
##                                          631.1111
##          Drivers...Persons.Injured...Minor.Injury
##                                         1326.2500
##              Passengers...Persons.Killed...Number
##                                          426.7778
## Passengers...Persons.Injured...Greviously.Injured
##                                          526.6944
##       Passengers...Persons.Injured...Minor.Injury
##                                          851.2778
```

```
##calculating median
apply(data22[,2:7],2,median)
```

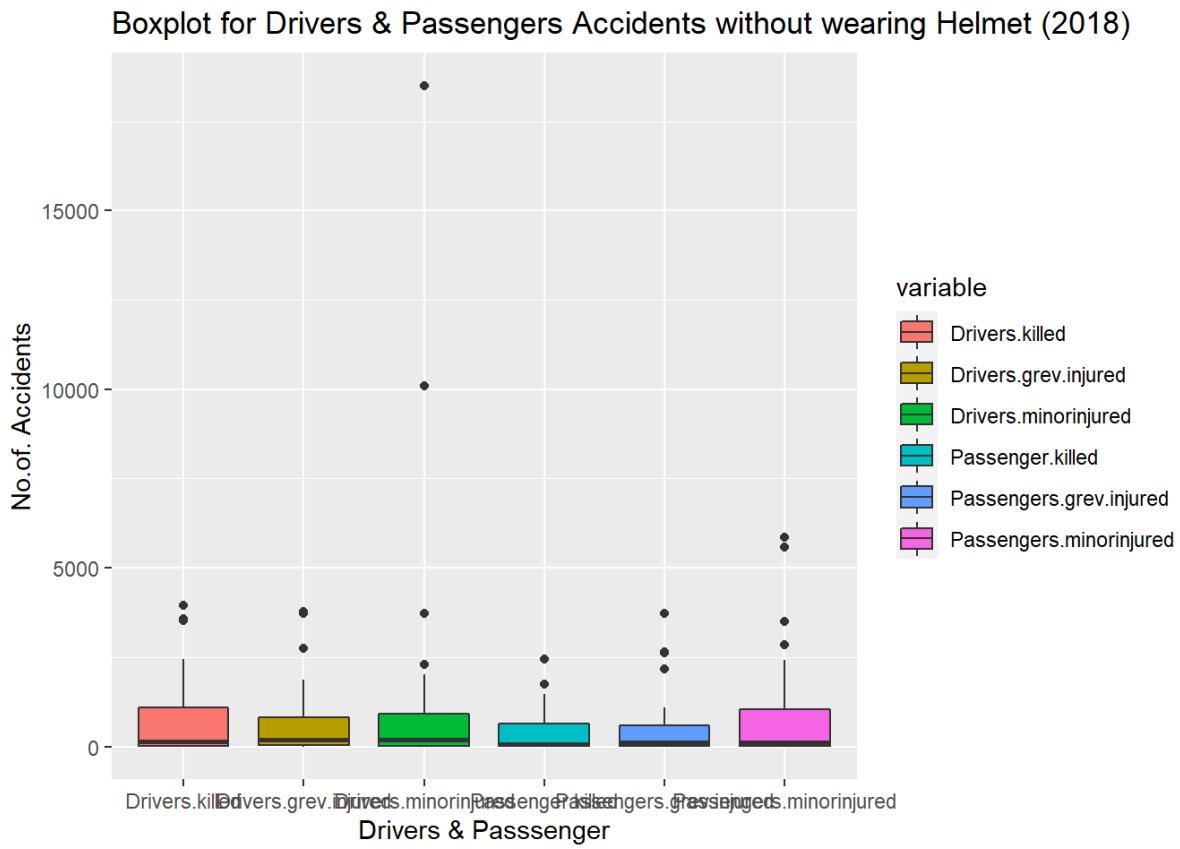
```
##                 Drivers...Persons.Killed...Number
```

```
##                                                138.5
##    Drivers...Persons.Injured...Greviously.Injured
##                                                201.0
##          Drivers...Persons.Injured...Minor.Injury
##                                                181.5
##              Passengers...Persons.Killed...Number
##                                                 71.0
## Passengers...Persons.Injured...Greviously.Injured
##                                                106.5
##       Passengers...Persons.Injured...Minor.Injury
##                                                114.0
```

```
##boxplot

library(ggplot2)

data3<-data2[-1]

library(reshape2)

colnames(data3)<-c("Drivers.killed","Drivers.grev.injured","Drivers.minorinjured","Passenger.killed","Passengers.grev.injured","Passengers.minorinjured")

data4<-melt(data3)
```

```
## No id variables; using all as measure variables
```

```
##boxplot


a<-ggplot(data4,aes(x=variable,y=value,fill=variable))+geom_boxplot()+ggtitle("Boxplot for Drivers & Passengers Accidents without wearing Helmet (2018)")+

  xlab("Drivers & Passsenger")+ylab("No.of. Accidents")

a
```

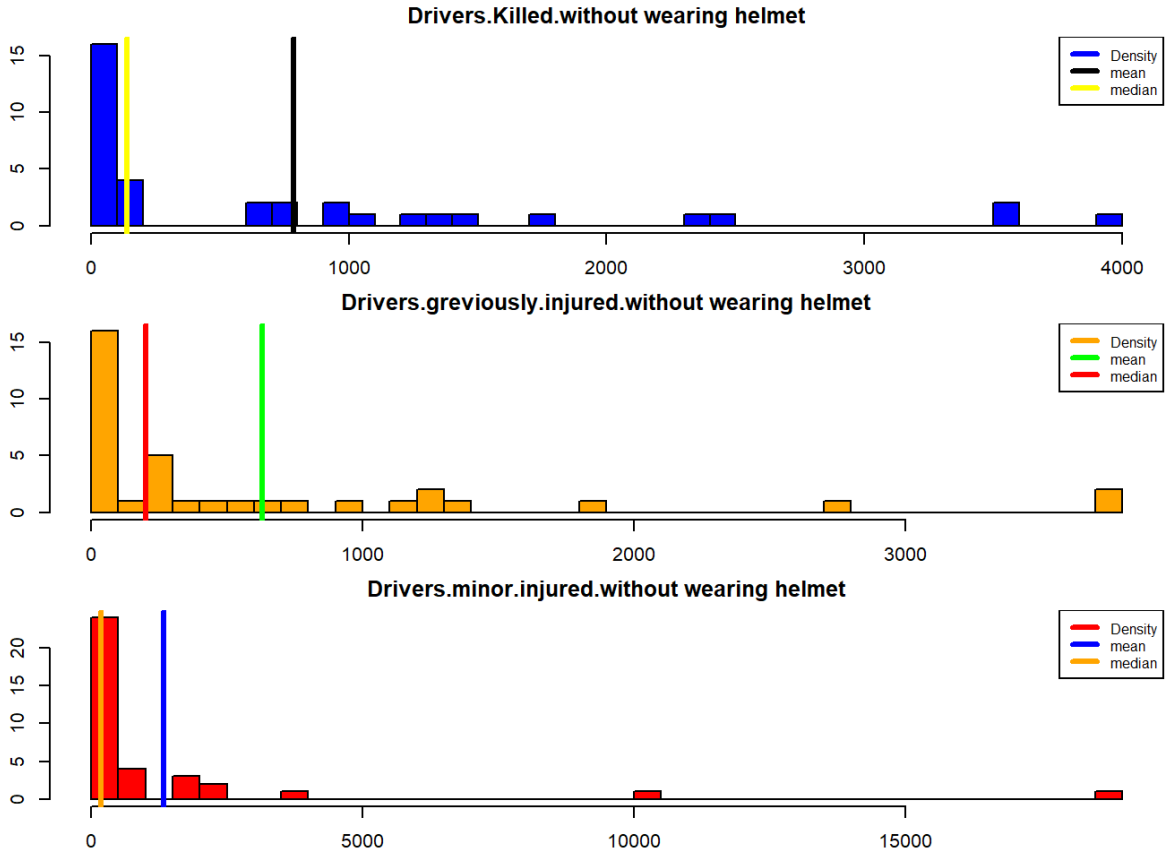


Inference:

The above box plot shows the minimum and maximum, first quartile(lower), third quartile(upper) and median values for all the variables. In the above plot by comparing drivers and passenger's drivers minor injured are most killed without wearing helmet.

```
##plotting histogram

##histogram for drivers not wearing helmet

par(mfrow=c(3,1))

par(mar=rep(2,4))

hist(data3$Drivers.killed,col = "blue",breaks=30,main = "Drivers.Killed.wit
hout wearing helmet",xlab = "no.of.drivers.killed",ylab = "Frequency")

abline(v=mean(data3$Drivers.killed),col = "black",lwd=3)

abline(v=median(data3$Drivers.killed),col = "yellow",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("blue","black","yell
ow"),cex=0.75,lwd=c(3,3,3))


hist(data3$Drivers.grev.injured,breaks=30,col = "orange",main = "Drivers.gr
ievously.injured.without wearing helmet",xlab = "no.of.drivers.killed",ylab
= "Frequency")

abline(v=mean(data3$Drivers.grev.injured),col = "green",lwd=3)

abline(v=median(data3$Drivers.grev.injured),col = "red",lwd=3)
```

```
legend(x="topright",c("Density","mean","median"),col=c("orange","green","red"),cex=0.75,lwd=c(3,3,3))


hist(data3$Drivers.minorinjured,breaks=30,col = "red",main = "Drivers.minor.injured.without wearing helmet",xlab = "no.of.drivers.killed",ylab = "Frequency")

abline(v=mean(data3$Drivers.minorinjured),col = "blue",lwd=3)

abline(v=median(data3$Drivers.minorinjured),col = "orange",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("red","blue","orange"),cex=0.75,lwd=c(3,3,3))
```

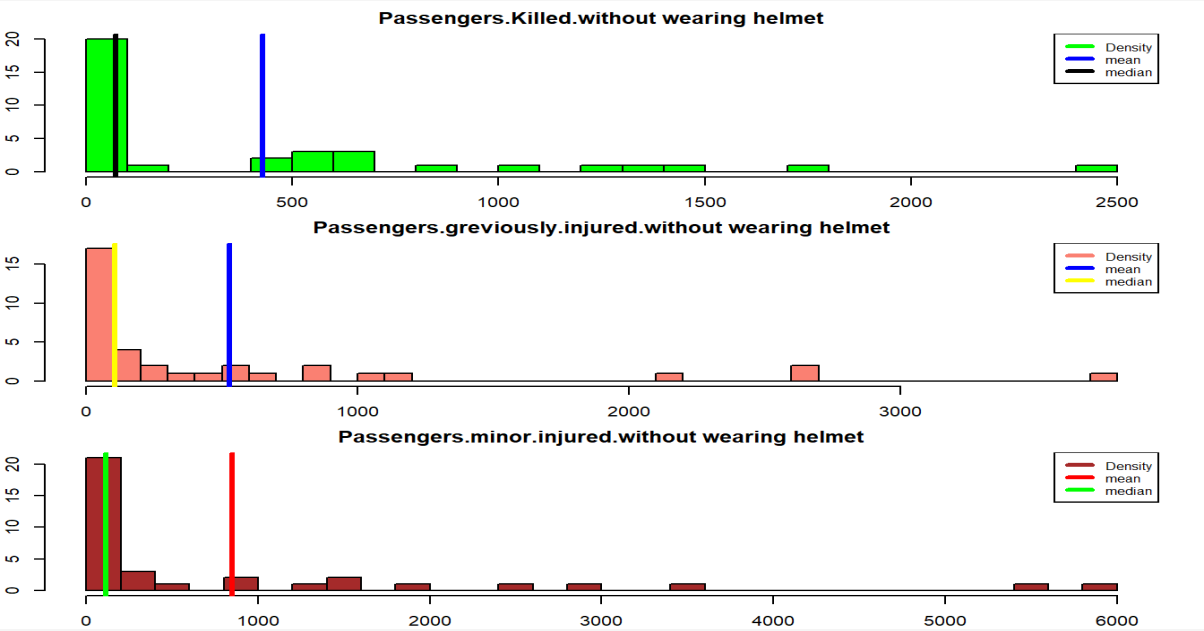


Inference:

The above plot is right skewed distribution. It shows the histogram for drivers killed ,drivers grievously injured and drivers minor injured. In this drivers killed median value is greater than drivers grievously injured. By comparing drivers grievously injured and drivers minor injured the median value is less than drivers minor injured.

```
##histogram for passenger not wearing helmet

par(mfrow=c(3,1))

par(mar=rep(2,4))

hist(data3$Passenger.killed,breaks=30,col = "green",main = "Passengers.Killed.without wearing helmet",xlab = "no.of.Passengers.killed",ylab = "Frequency")
```

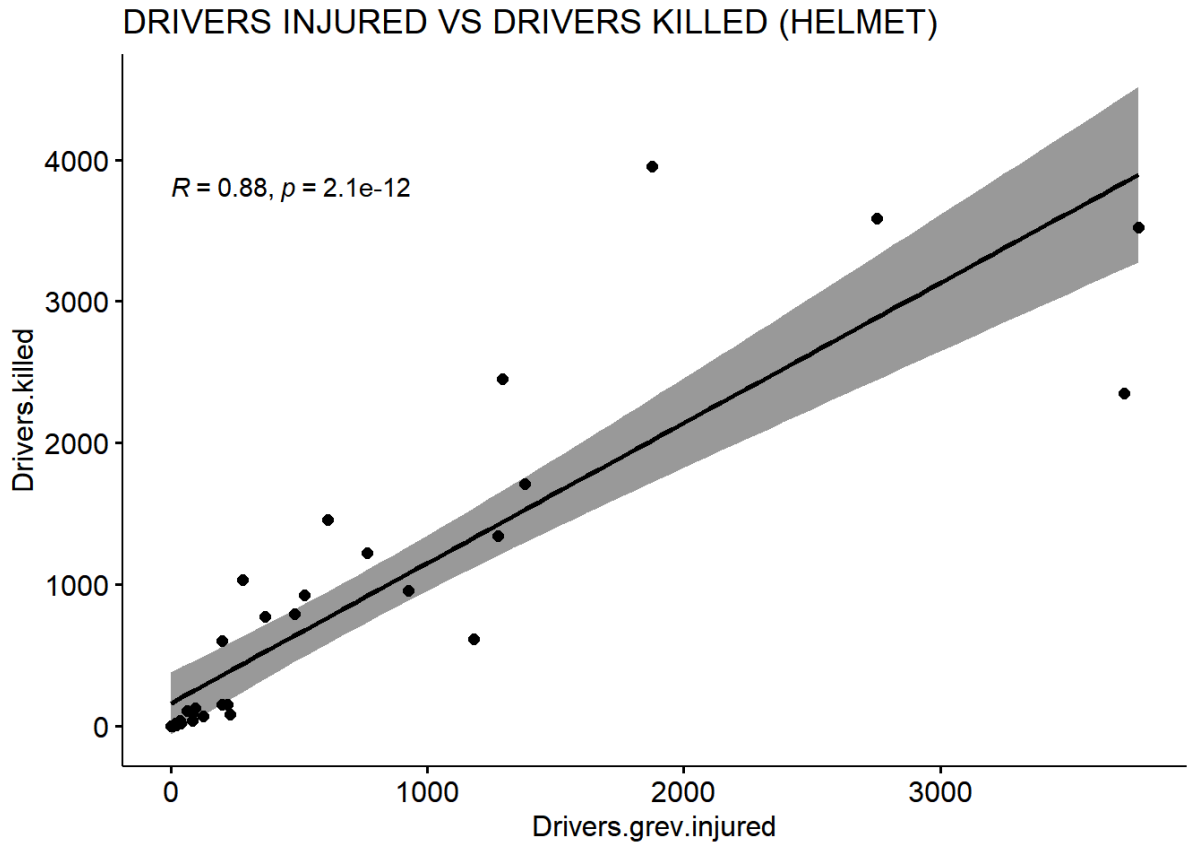
```
abline(v=mean(data3$Passenger.killed),col = "blue",lwd=3)

abline(v=median(data3$Passenger.killed),col = "black",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("green","blue","blac
k"),cex=0.75,lwd=c(3,3,3))



hist(data3$Passengers.grev.injured,breaks=30,col = "salmon",main = "Passeng
ers.grievously.injured.without wearing helmet",xlab = "no.of.Passengers.kil
led",ylab = "Frequency")

abline(v=mean(data3$Passengers.grev.injured),col = "blue",lwd=3)

abline(v=median(data3$Passengers.grev.injured),col = "yellow",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("salmon","blue","yel
low"),cex=0.75,lwd=c(3,3,3))



hist(data3$Passengers.minorinjured,breaks=30,col = "brown",main = "Passenge
rs.minor.injured.without wearing helmet",xlab = "no.of.Passengers.killed",y
lab = "Frequency")

abline(v=mean(data3$Passengers.minorinjured),col = "red",lwd=3)

abline(v=median(data3$Passengers.minorinjured),col = "green",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("brown","red","green
"),cex=0.75,lwd=c(3,3,3))
```



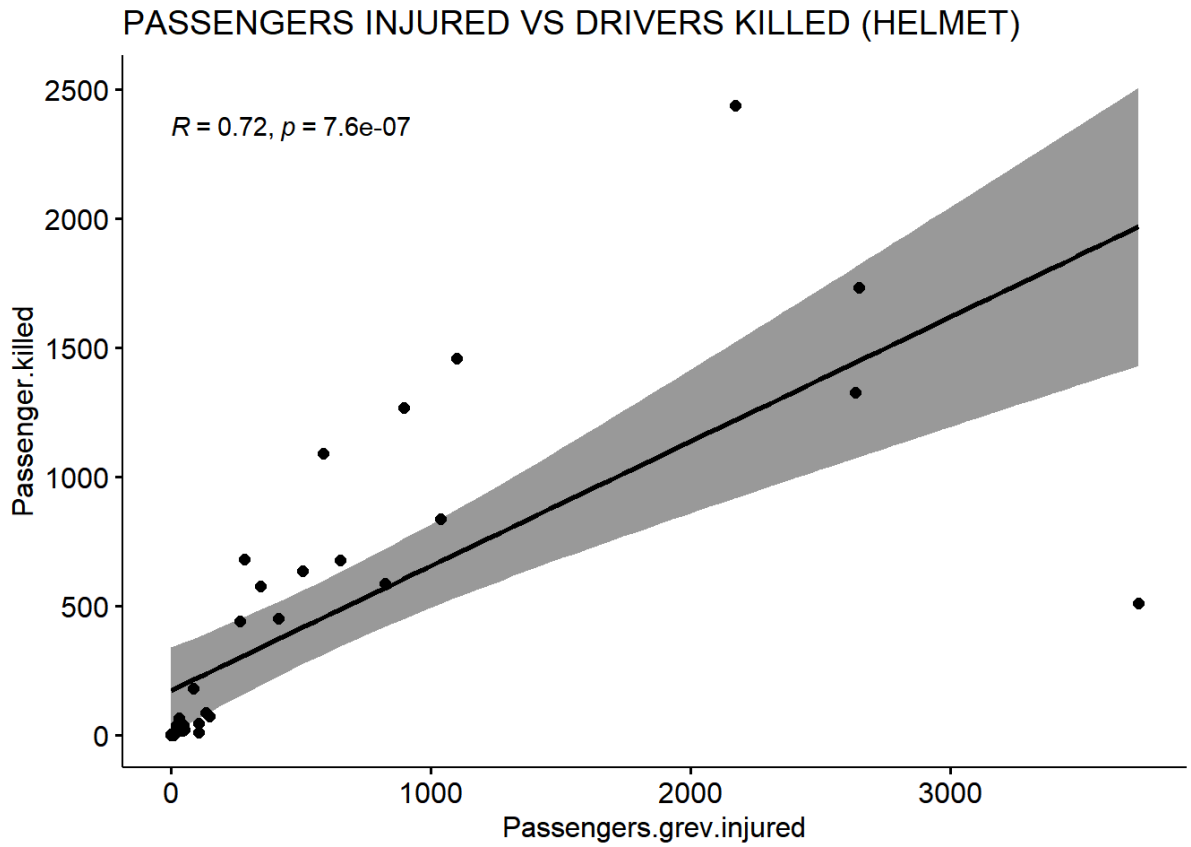
Inference:

The above plot is right skewed distribution. It shows the histogram for passengers killed ,passengers grievously injured, passengers minor injured.In this passengers killed mean value 426.778 and passengers grievously injured mean value 526.6944 .By comparing the passengers grievously killed median value is greater than passengers minor injured.

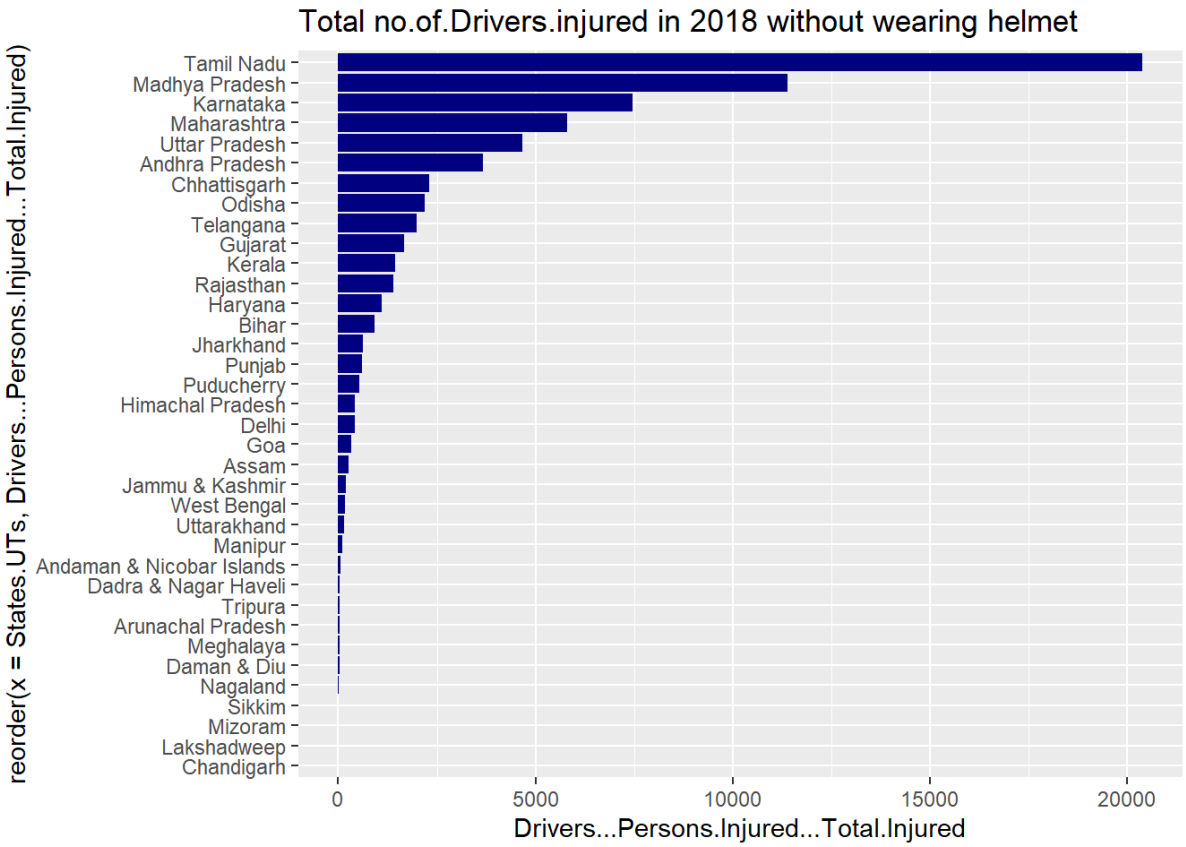
```
#SCATTER PLOT

#Drivers

ggscatter(data33,x="Drivers.grev.injured",y="Drivers.killed",add = "reg.line",conf.int = TRUE,cor.coef = TRUE,method = "pearson")+ggtitle("DRIVERS INJURED VS DRIVERS KILLED (HELMET)")
```




```
#Passengers


ggscatter(data33,x="Passengers.grev.injured",y="Passenger.killed",add = "reg.line",conf.int = TRUE,cor.coef = TRUE,method = "pearson")+ggtitle("PASSENGERS INJURED VS DRIVERS KILLED (HELMET)")
```



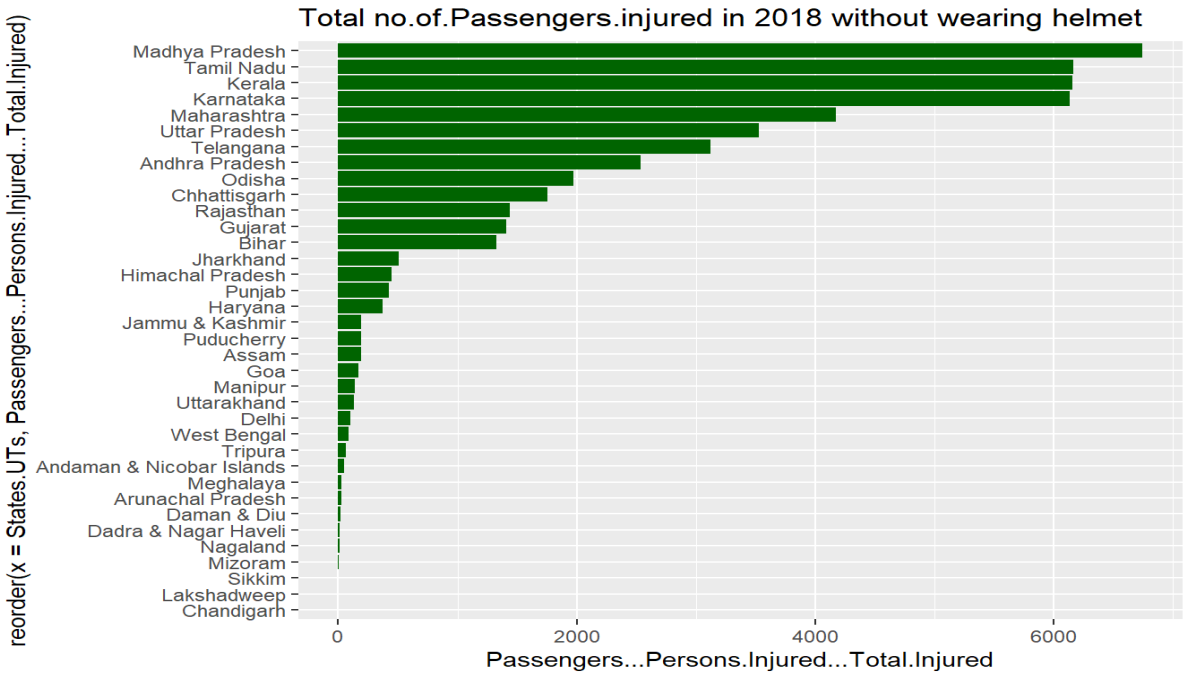

```
b<-ggplot(data=data1,aes(reorder(x=States.UTs,Drivers...Persons.Injured...T
otal.Injured),y=Drivers...Persons.Injured...Total.Injured))+coord_flip()+ge
om_bar(stat="identity",fill = "navy")+ggtitle("Total no.of.Drivers.injured
in 2018 without wearing helmet")

b
```



Inference:

The above plot shows the Total number of drivers injured in 2018 without wearing helmet. The total number of drivers are mostly injured in Tamilnadu. The top five injured states are Tamilnadu, Madhya Pradesh, Karnataka, Maharashtra, Uttar Pradesh.

```
##barplot for not wearing helmet(Passengers)

c<-ggplot(data1,aes(reorder(x=States.UTs,Passengers...Persons.Injured...Tot
al.Injured),y=Passengers...Persons.Injured...Total.Injured))+coord_flip()+g
eom_bar(stat="identity",fill = "dark green")+ggtitle("Total no.of.Passenger
s.injured in 2018 without wearing helmet")

c
```

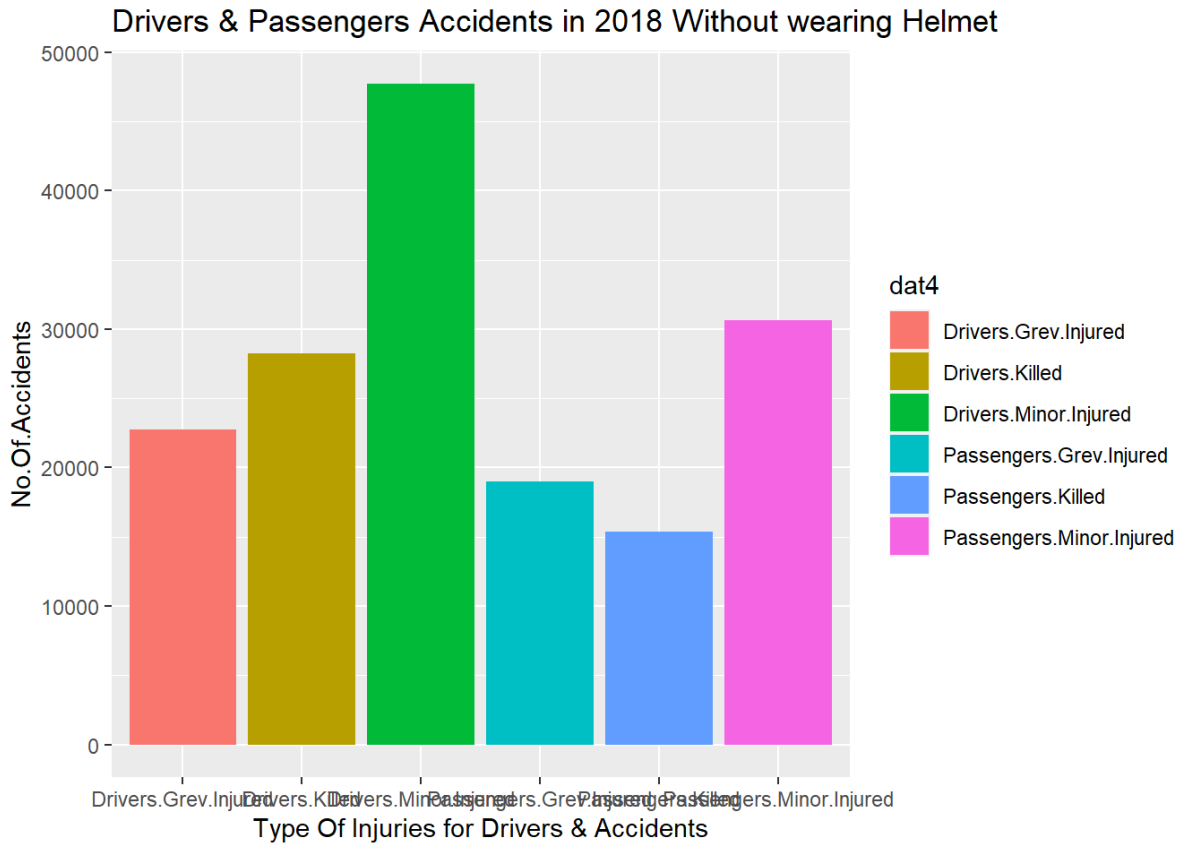


Inference:

The above plot shows the Total number of passengers injured in 2018 without wearing helmet. The total number of passengers are mostly injured in Madhya Pradesh. The top five injured states are Madhya Pradesh, Tamilnadu, Kerala, Karnataka, Maharashtra.

```
##barplot for Accidents happened for Drivers & Passengers in 2018-without h
elmet

library(RColorBrewer)

dat1<-non_wearing_helmet[37,]

dat2<-dat1[c(3,5,6,8,10,11)]

dat3<-data.frame(t(dat2))

dat4<-c("Drivers.Killed","Drivers.Grev.Injured","Drivers.Minor.Injured","Pa
ssengers.Killed","Passengers.Grev.Injured","Passengers.Minor.Injured")

dat5<-data.frame(dat4,dat3$X37)

col1<-brewer.pal(6,"Set1")

ggplot(dat5,aes(x=dat5$dat4,y=dat5$dat3.X37,fill=dat4))+geom_bar(stat="iden
tity",)+theme()+ggtitle("Drivers & Passengers Accidents in 2018 Without wea
ring Helmet")+xlab("Type Of Injuries for Drivers & Accidents")+ylab("No.Of.
Accidents")
```

```
## Warning: Use of `dat5$dat4` is discouraged. Use `dat4` instead.

## Warning: Use of `dat5$dat3.X37` is discouraged. Use `dat3.X37` instead.
```



Inference:

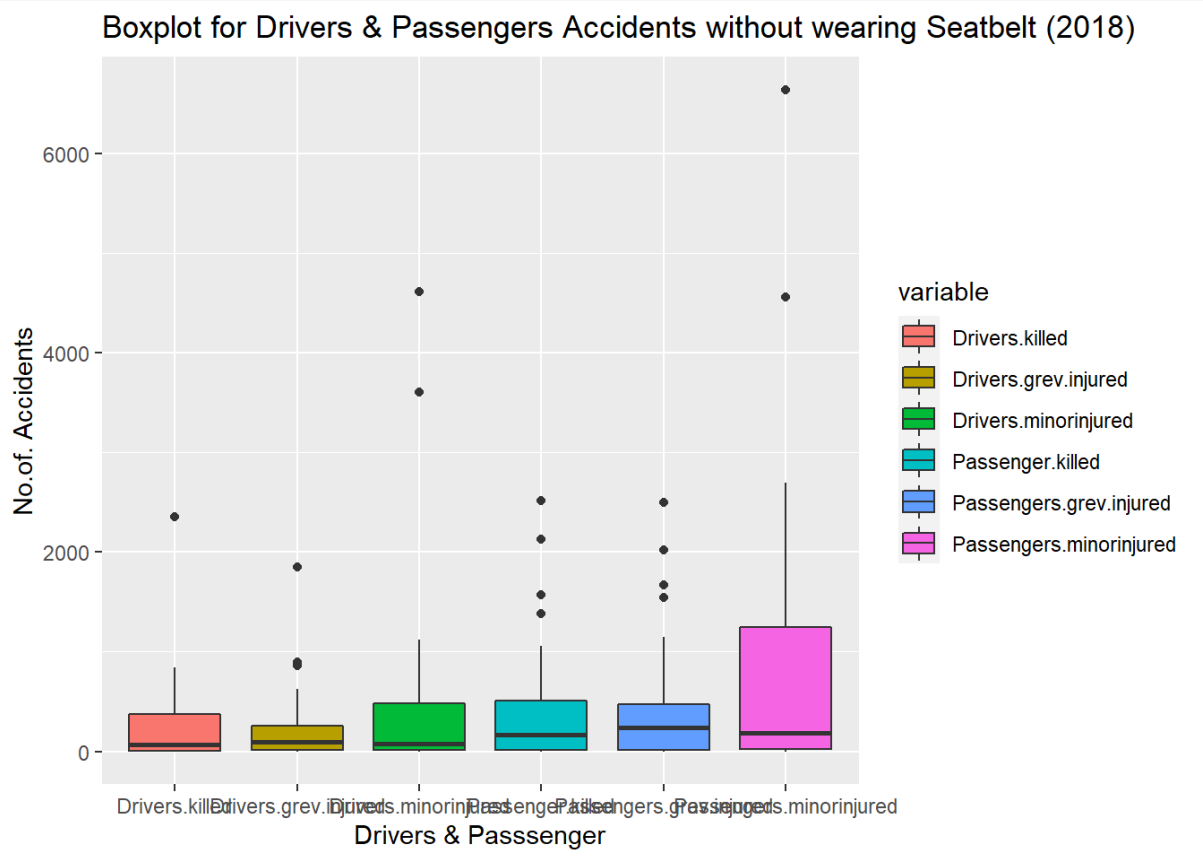
The above plot shows the drivers and passengers Accidents in 2018 without wearing helmet. In this we can see the highest value was drivers Minor injured.

```
##2. ACCIDENTS IN 2018 WITHOUT WEARING SEATBELT
##loading dataset
non_wearing_seatbelt<-read.csv("C:/Users/Tenisha/Documents/acci_data/Non-Use of Safety Device (Non-Wearing of Seat Belt) by Victims during 2018.csv")
library(dplyr)
##checking missing values
##removing unnecessary rows and columns
##removing total rows
data1<-non_wearing_seatbelt[-37,]
##removing unwanted columns which contains
data2<-data1[-c(1,4,7,9,12)]
##boxplot
library(ggplot2)
dat3<-data2[-1]
```

```
library(reshape2)

colnames(dat3)<-c("Drivers.killed","Drivers.grev.injured","Drivers.minorinj
ured","Passenger.killed","Passengers.grev.injured","Passengers.minorinjured
")

data4<-melt(dat3)
```

```
## No id variables; using all as measure variables
```

```
a<-ggplot(data4,aes(x=variable,y=value,fill=variable))+geom_boxplot()+ggtit
le("Boxplot for Drivers & Passengers Accidents without wearing Seatbelt (20
18)")+xlab("Drivers & Passsenger")+ylab("No.of. Accidents")
```



Inference:

In the above plot by comparing drivers and passengers accidents without wea ring seatbelt passengers minor injured are killed the most without wearing seatbelt.

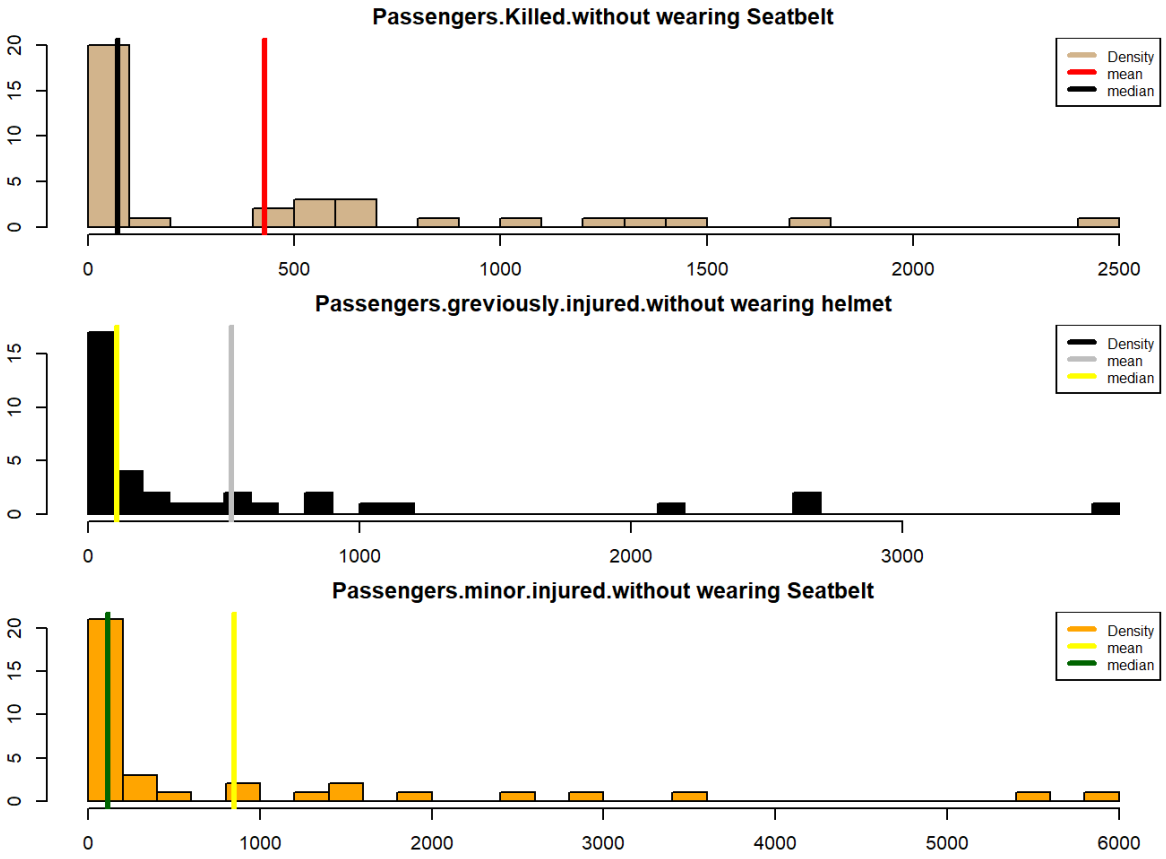
```
##plotting histogram

##histogram for drivers not wearing helmet

par(mfrow=c(3,1))

par(mar=rep(2,4))
```

```
hist(data3$Drivers.killed,breaks=30,col = "gold",main = "Drivers.Killed.wit
hout wearing Seatbelt",xlab = "no.of.drivers.killed",ylab = "Frequency")

abline(v=mean(data3$Drivers.killed),col = "black",lwd=3)

abline(v=median(data3$Drivers.killed),col = "green",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("gold","black","gree
n"),cex=0.75,lwd=c(3,3,3))


hist(data3$Drivers.grev.injured,breaks=30,col = "deep sky blue",main = "Dri
vers.grievously.injured.without wearing Seatbelt",xlab = "no.of.drivers.kil
led",ylab = "Frequency")

abline(v=mean(data3$Drivers.grev.injured),col = "brown",lwd=3)

abline(v=median(data3$Drivers.grev.injured),col = "orange",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("deep sky blue","bro
wn","orange"),cex=0.75,lwd=c(3,3,3))


hist(data3$Drivers.minorinjured,breaks=30,col = "wheat",main = "Drivers.min
or.injured.without wearing Seatbelt",xlab = "no.of.drivers.killed",ylab = "
Frequency")

abline(v=mean(data3$Drivers.minorinjured),col = "red",lwd=3)

abline(v=median(data3$Drivers.minorinjured),col = "maroon",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("wheat","red","maroo
n"),cex=0.75,lwd=c(3,3,3))
```

Inference:

The above plot is right skewed distribution. The above histogram shows the drivers killed ,drivers grievously killed and drivers minor injured. In this drivers grievously injured median value is greater which is 91.50.

```
##histogram for passenger not wearing seatbelt

par(mfrow=c(3,1))

par(mar=rep(2,4))

hist(data3$Passenger.killed,breaks=30,col = "tan",main = "Passengers.Killed
.without wearing Seatbelt",xlab = "no.of.Passengers.killed",ylab = "Frequen
cy")

abline(v=mean(data3$Passenger.killed),col = "red",lwd=3)

abline(v=median(data3$Passenger.killed),col = "black",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("tan","red","black")
,cex=0.75,lwd=c(3,3,3))

hist(data3$Passengers.grev.injured,breaks=30,col = "black",main = "Passenge
rs.grievously.injured.without wearing helmet",xlab = "no.of.Passengers.kill
ed",ylab = "Frequency")




abline(v=mean(data3$Passengers.grev.injured),col = "gray",lwd=3)

abline(v=median(data3$Passengers.grev.injured),col = "yellow",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("black","gray","yell
ow"),cex=0.75,lwd=c(3,3,3))




hist(data3$Passengers.minorinjured,breaks=30,col = "orange",main = "Passeng
ers.minor.injured.without wearing Seatbelt",xlab = "no.of.Passengers.killed
",ylab = "Frequency")

abline(v=mean(data3$Passengers.minorinjured),col = "yellow",lwd=3)

abline(v=median(data3$Passengers.minorinjured),col = "dark green",lwd=3)

legend(x="topright",c("Density","mean","median"),col=c("orange","yellow","d
ark green"),cex=0.75,lwd=c(3,3,3))
```



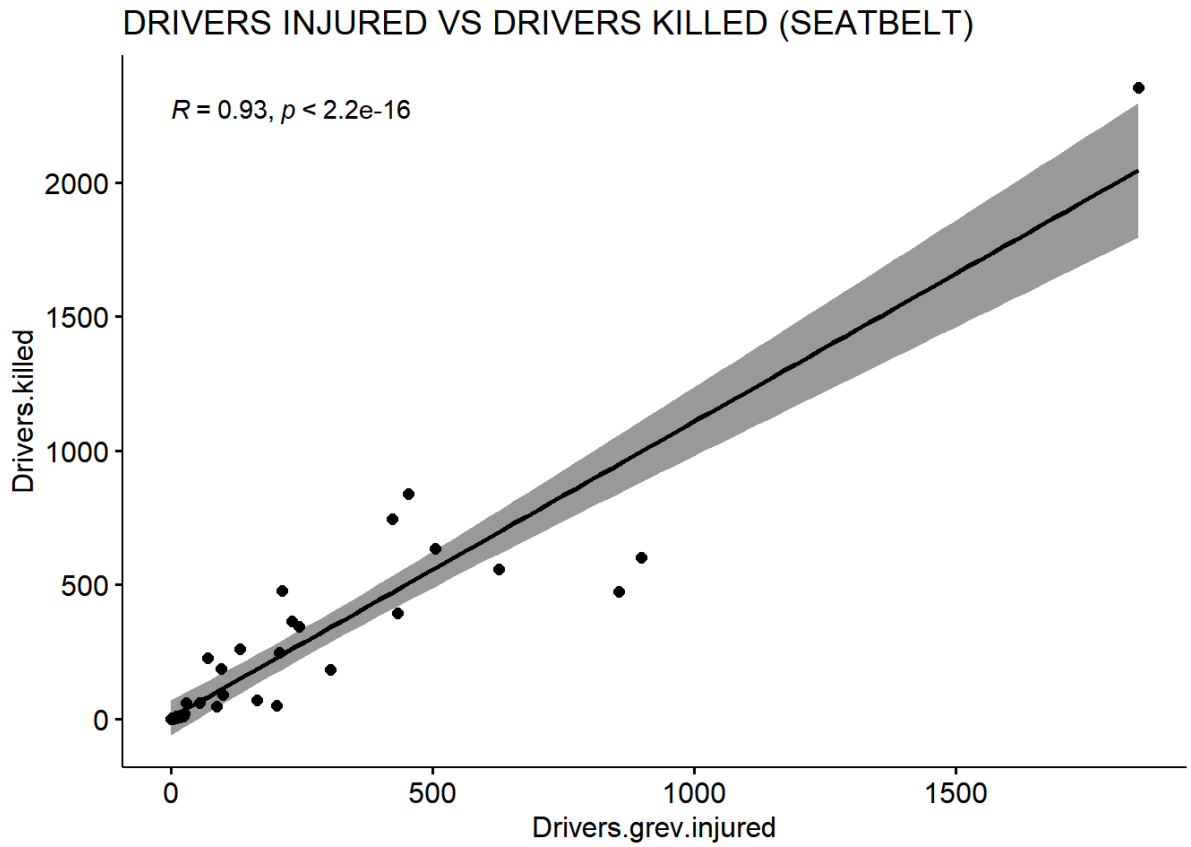
Inference:

The above plot is right skewed distribution.The above plot shows histogram for passengers killed, passengers grievously injured and passengers minor injured. In this passengers killed mean value is 419.1 and passengers grievously injured mean value is 441.1. By comparing the median value of passengers grievously injured and passengers minor injured, passengers grievously injured median value is greater than passengers minor injured.

```
#SCATTER PLOT DRIVERS


ggscatter(data3,x="Drivers.grev.injured",y="Drivers.killed",add = "reg.line
",conf.int = TRUE,cor.coef = TRUE,method = "pearson")+ggtitle("DRIVERS INJU
RED VS DRIVERS KILLED (SEATBELT)")
```

```
## Warning: Ignoring unknown parameters: method
```

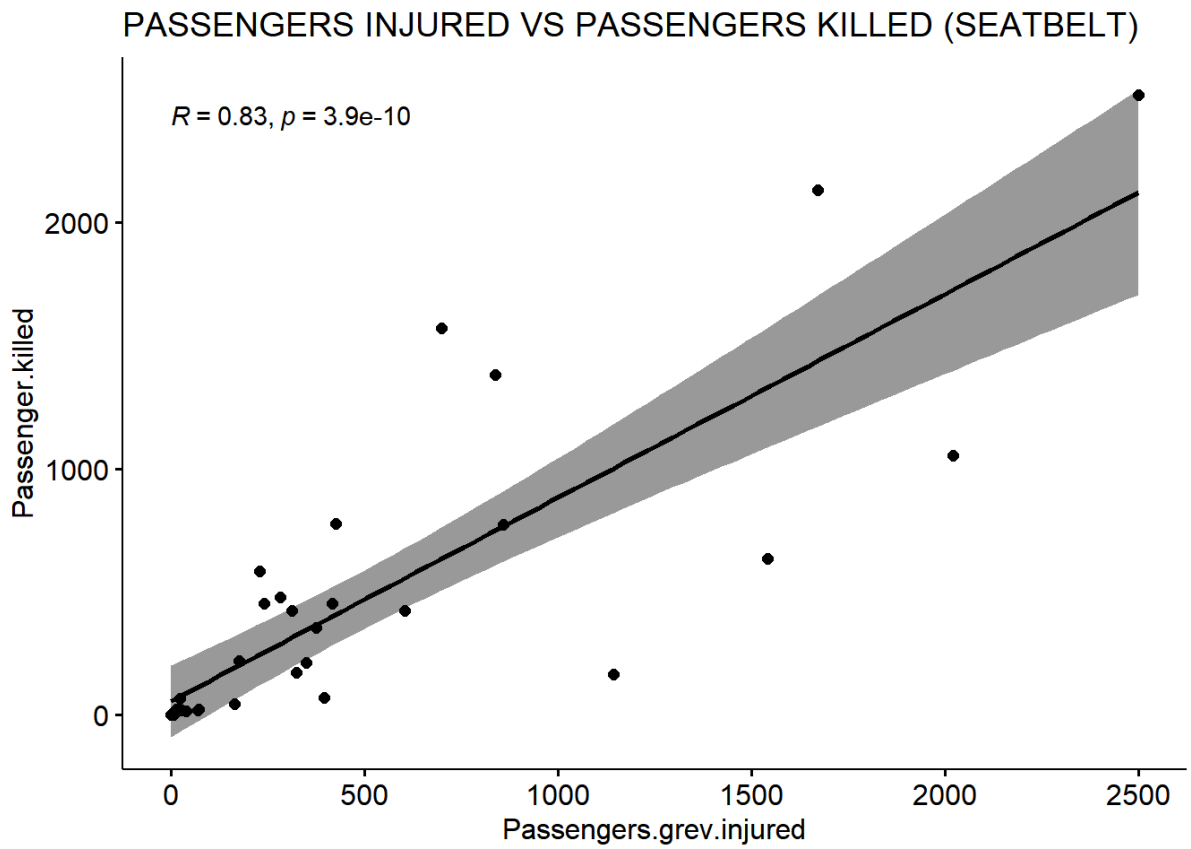
```
## `geom_smooth()` using formula 'y ~ x'
```




```
ggscatter(data3,x="Passengers.grev.injured",y="Passenger.killed",add = "reg
.line",conf.int = TRUE,cor.coef = TRUE,method = "pearson")+ggtitle("PASSENG
ERS INJURED VS PASSENGERS KILLED (SEATBELT)")
```

```
## Warning: Ignoring unknown parameters: method
```

```
## `geom_smooth()` using formula 'y ~ x'
```




```
##barplot for not wearing Seatbelt(Drivers)

b<-ggplot(data=data1,aes(reorder(x=States.UTs,Drivers...Persons.Injured...T
otal.Injured),y=Drivers...Persons.Injured...Total.Injured,fill=States.UTs))
+coord_flip()+geom_bar(stat="identity")+ggtitle("Total no.of.Drivers.injure
d in 2018 without wearing Seatbelt")+xlab("States&Union Territories")+ylab(
"No.of.Accidents")

b
```

Inference:

This shows the total number of drivers injured in 2018 without wearing seatbelt Here Tamil nadu tops the list which is followed by Madhya Pradesh, Uttar Pradesh, Karnataka, Rajasthan.

```
##barplot for not wearing Seatbelt(Passengers)

c<-ggplot(data1,aes(reorder(x=States.UTs,Passengers...Persons.Injured...Tot
al.Injured),y=Passengers...Persons.Injured...Total.Injured,fill=States.UTs)
)+coord_flip()+geom_bar(stat="identity")+ggtitle("Total no.of.Passengers.in
jured in 2018 without wearing Seatbelt")+xlab("States&Union Territories")+y
lab("No.of.Accidents")

c
```

```
##interactive plot

ggplotly(c)
```

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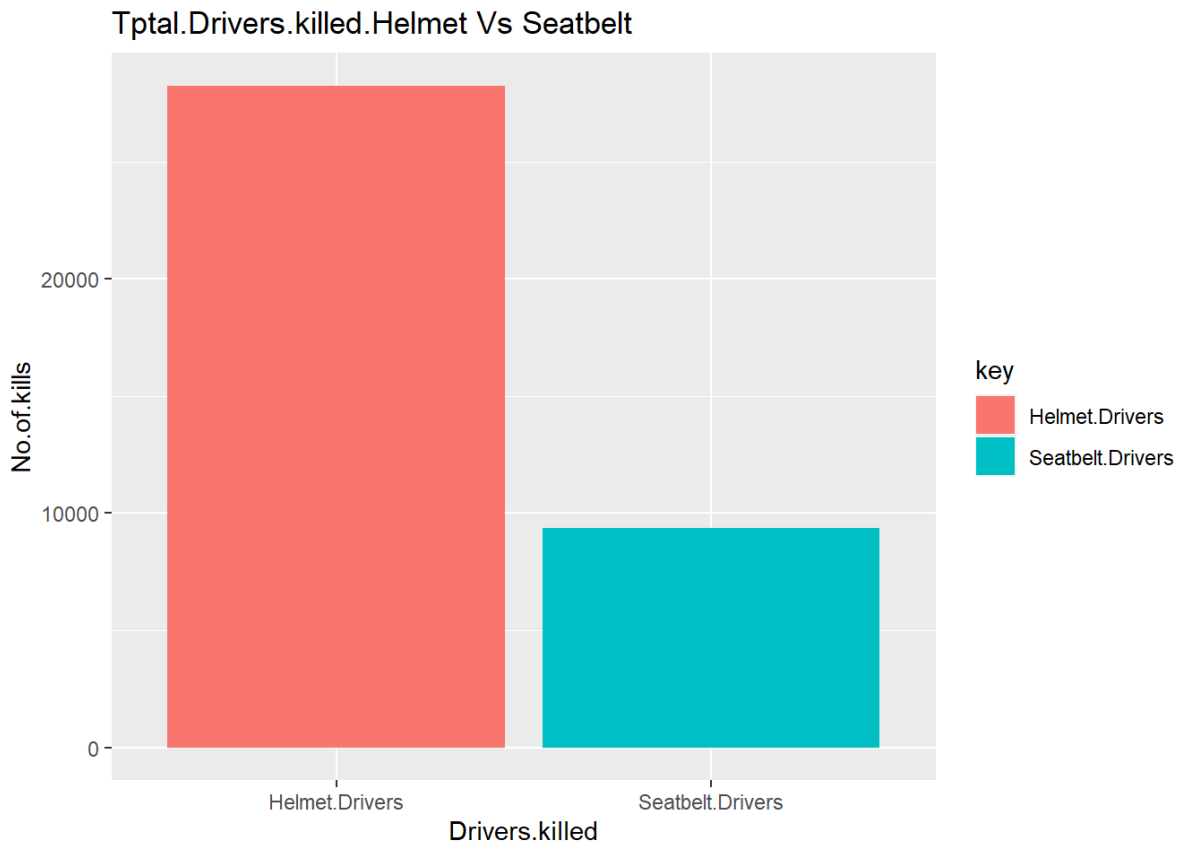
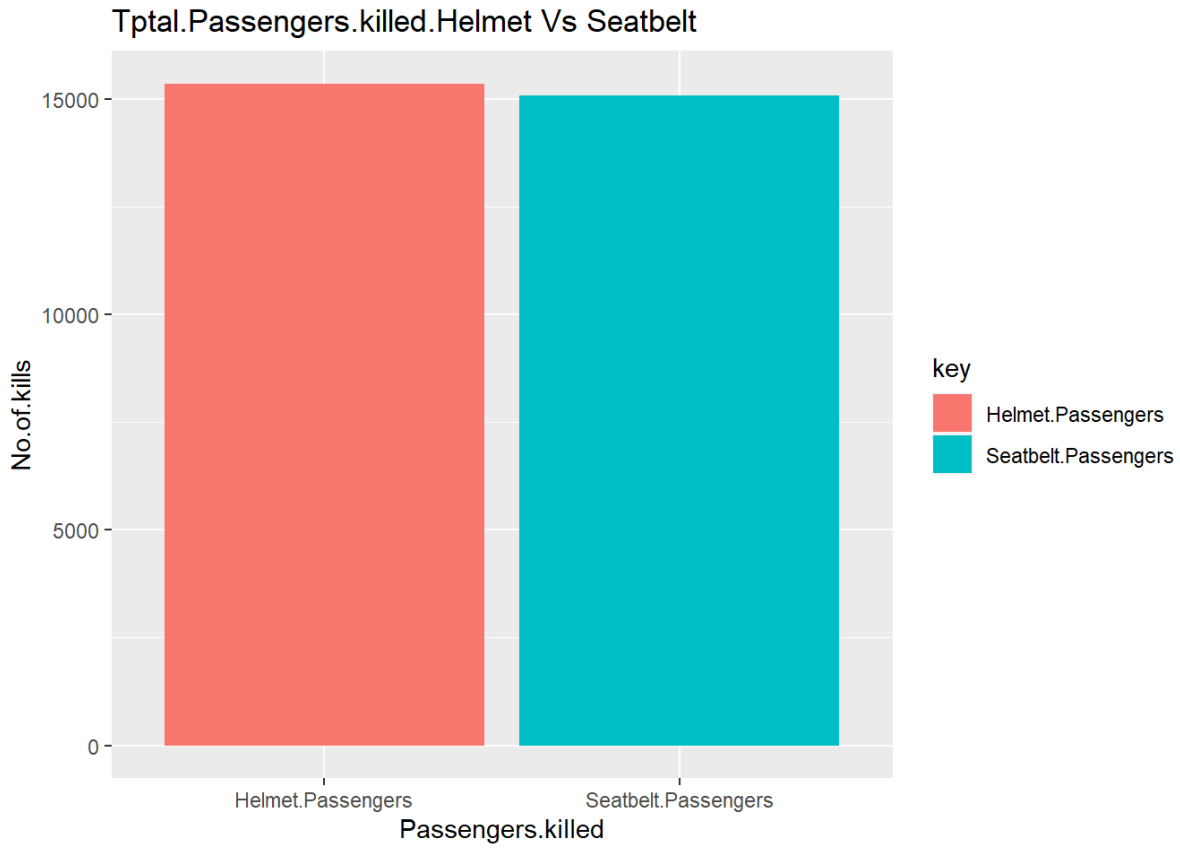
```
# TYPE OF ACCIDENTS

Type_of_Accidents_2018<-read.csv("C:/Users/Tenisha/Desktop/Accidents_dataset/Road-Accidents-2018--type of accidents in 2018.csv")

##barplot

library(ggplot2)

library(plotly)

a<-ggplot(data = tota_accidents1,aes(reorder(x=States.UTs,Total.Accidents),y=Total.Accidents))+geom_bar(stat="identity",fill="salmon")+coord_flip()+ggtitle("Total Road Accidents in 2018")+xlab("States & Union Territories")+ylab("Total No.of Road Accidents")

a



helmet.killed<-data3[1]

seatbelt.killed<-d3[1]

Drivers.killed.helmetvseatbelt<-cbind.data.frame(helmet.killed,seatbelt.killed)

colnames(Drivers.killed.helmetvseatbelt)<-c("Helmet.Drivers","Seatbelt.Drivers")

df<-gather(Drivers.killed.helmetvseatbelt)

ggplot(df,aes(x=key,y=value,fill=key))+geom_bar(stat="identity")+ggtitle("Tptal.Drivers.killed.Helmet Vs Seatbelt")+

  xlab("Drivers.killed")+ylab("No.of.kills")
```



Inference:

This is a comparison between drivers killed without helmet and seatbelt. It is less that the drivers without helmet are killed the most compared to drivers without seatbelt.

```
##total killed Passengers helmet vs Seatbelt

helmet.passengers.killed<-data3[4]

seatbelt.passengers.killed<-d3[4]

Passengers.killed.helmetvsseatbelt<-cbind.data.frame(helmet.passengers.killed,seatbelt.passengers.killed)

colnames(Passengers.killed.helmetvsseatbelt)<-c("Helmet.Passengers","Seatbelt.Passengers")

df1<-gather(Passengers.killed.helmetvsseatbelt)


ggplot(df1,aes(x=key,y=value,fill=key))+geom_bar(stat="identity")+ggtitle("Tptal.Passengers.killed.Helmet Vs Seatbelt")+

  xlab("Passengers.killed")+ylab("No.of.kills")
```



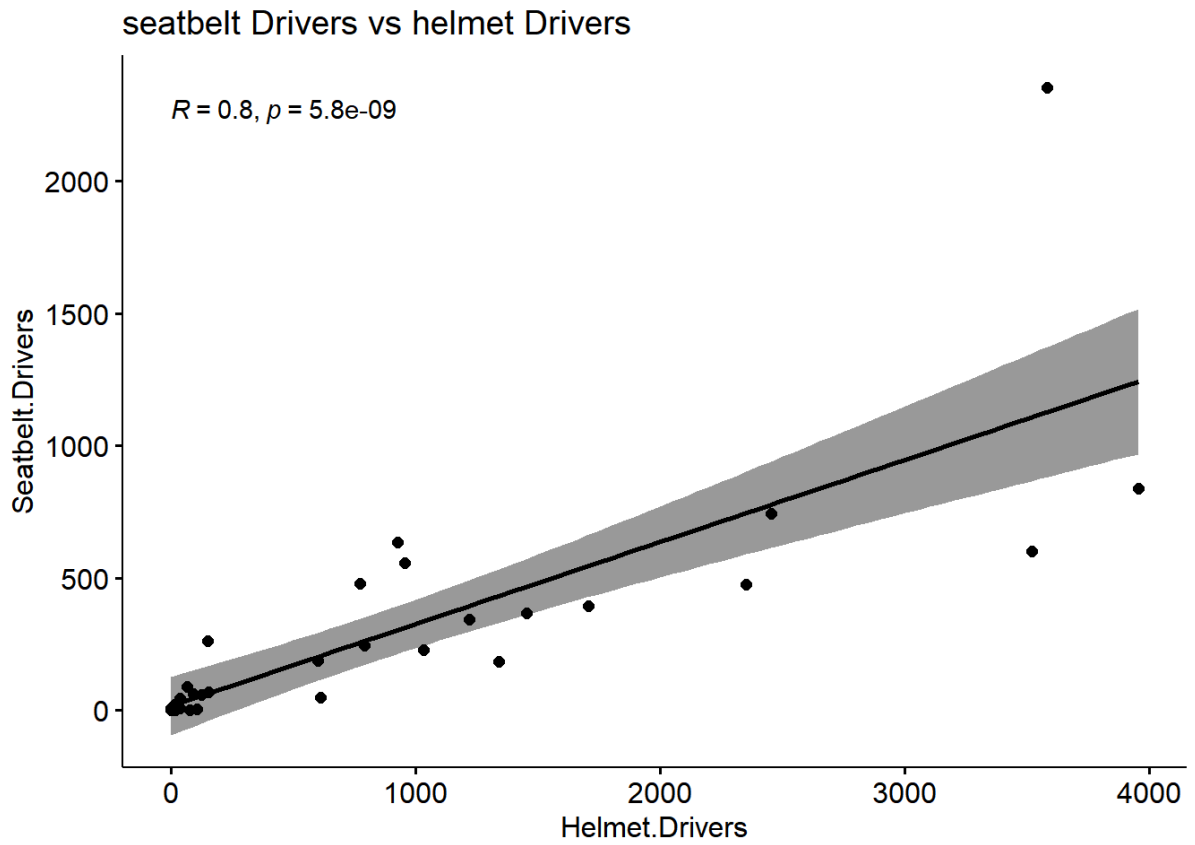
Inference:

Here is the comparison between the total passengers killed without helmet and seatbelt. Passengers without helmet are most likely killed.

```
ggscatter(Drivers.killed.helmetvseatbelt,x="Helmet.Drivers",y="Seatbelt.Dri
vers",add = "reg.line",conf.int = TRUE,cor.coef=TRUE,method = "pearson")+gg
title("seatbelt Drivers vs helmet Drivers")
```

```
## Warning: Ignoring unknown parameters: method
```

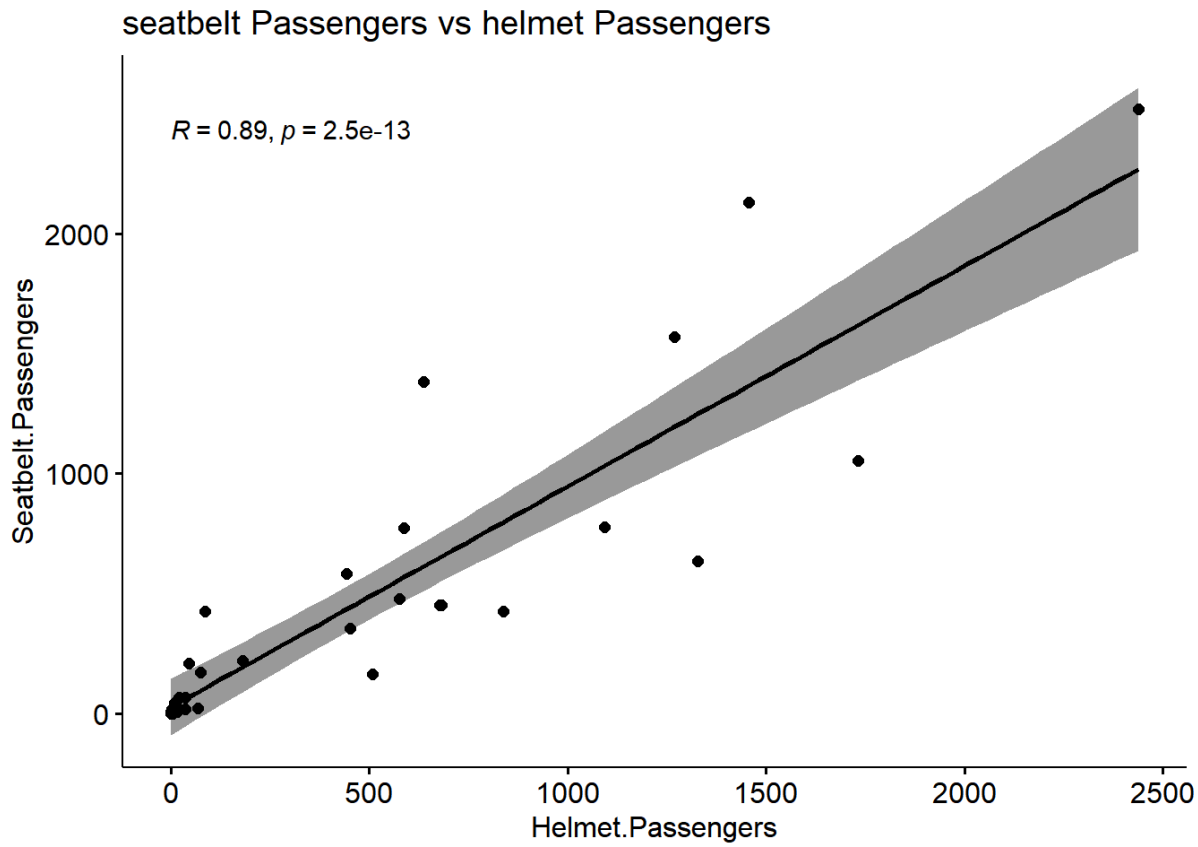
```
## `geom_smooth()` using formula 'y ~ x'
```




```
ggscatter(Passengers.killed.helmetvsseatbelt,x="Helmet.Passengers",y="Seatbelt.Passengers",add = "reg.line",conf.int = TRUE,cor.coef=TRUE,method = "pearson")+ggtitle("seatbelt Passengers vs helmet Passengers")
```

```
## Warning: Ignoring unknown parameters: method
```

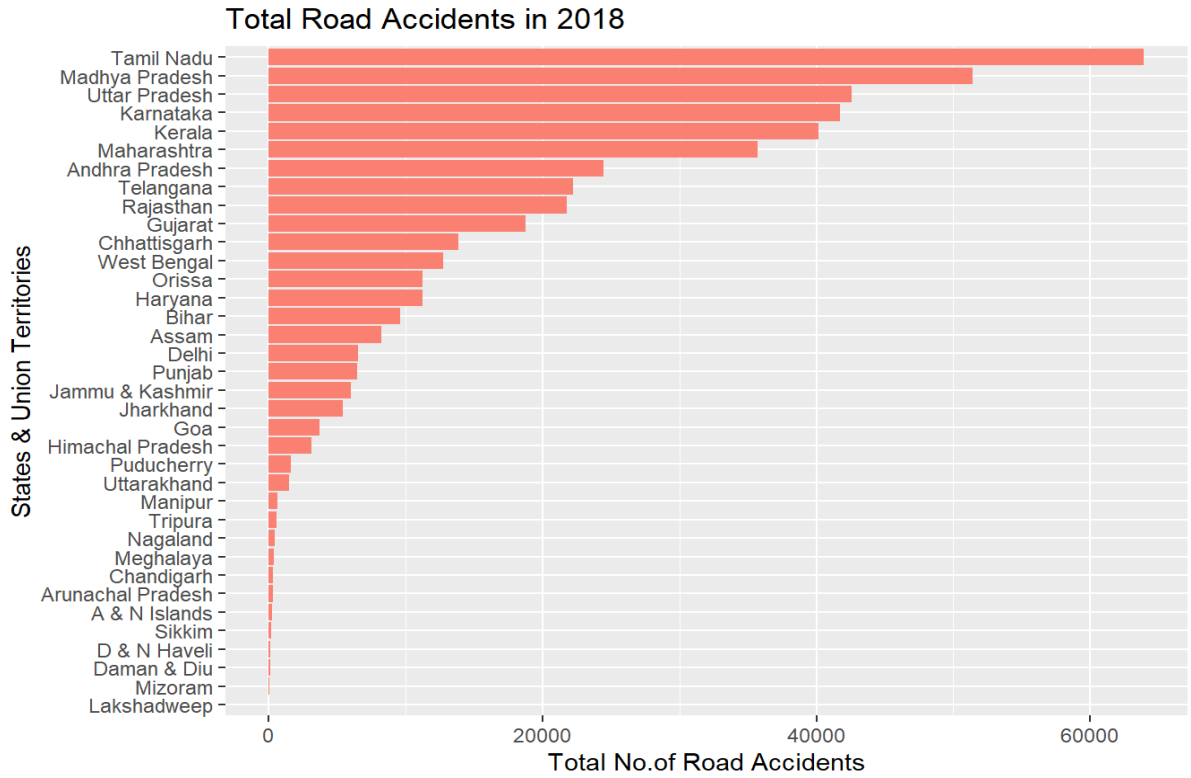
```
## `geom_smooth()` using formula 'y ~ x'
```




```
ggplot(Passengers.killed.helmetvsseatbelt,aes(x=Helmet.Passengers,y=Seatbel
t.Passengers))+ggtitle("seatbelt Passengers vs helmet Passengers")+geom_poi
nt()+geom_line()
```

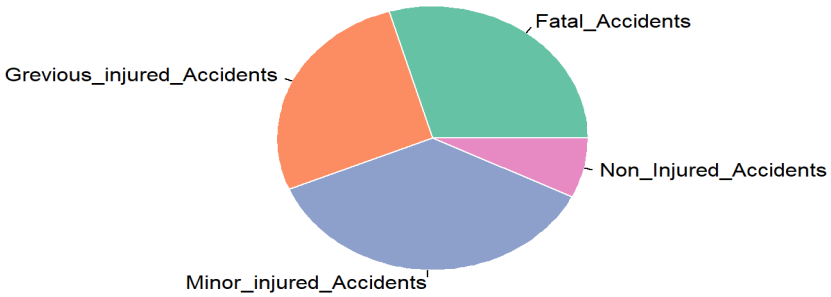
Inference:

The above plot shows the relationship between the Passengers killed in road accident without wearing seatbelt and helmet.




```
##Pie_chart for type of accidents
piechart<-Type_of_Accidents_2018[37,]
head(piechart)
##     S.No States.UTs Fatal.Accidents Grievous.Injury.Accidents
## 37 Total      Total          137726                     125311
##    Minor.Injury.Accidents Non.Injury.Accidents Total.Accidents
## 37                 169920                34087          467044
piechart1<-select(piechart,(3:6))
View(piechart1)
z<-t(piechart1)
z
##                                37
## Fatal.Accidents            137726
## Grievous.Injury.Accidents  125311
## Minor.Injury.Accidents     169920
## Non.Injury.Accidents        34087
df1<-c("Fatal_Accidents","Grievously_injured_Accidents","Minor_injured_Acci
dents","Non_injury_Accidents")
df1<-c("Fatal_Accidents","Grievously_injured_Accidents","Minor_injured_Acci
dents","Non_injury_Accidents")
df2<-data.frame(z)
```

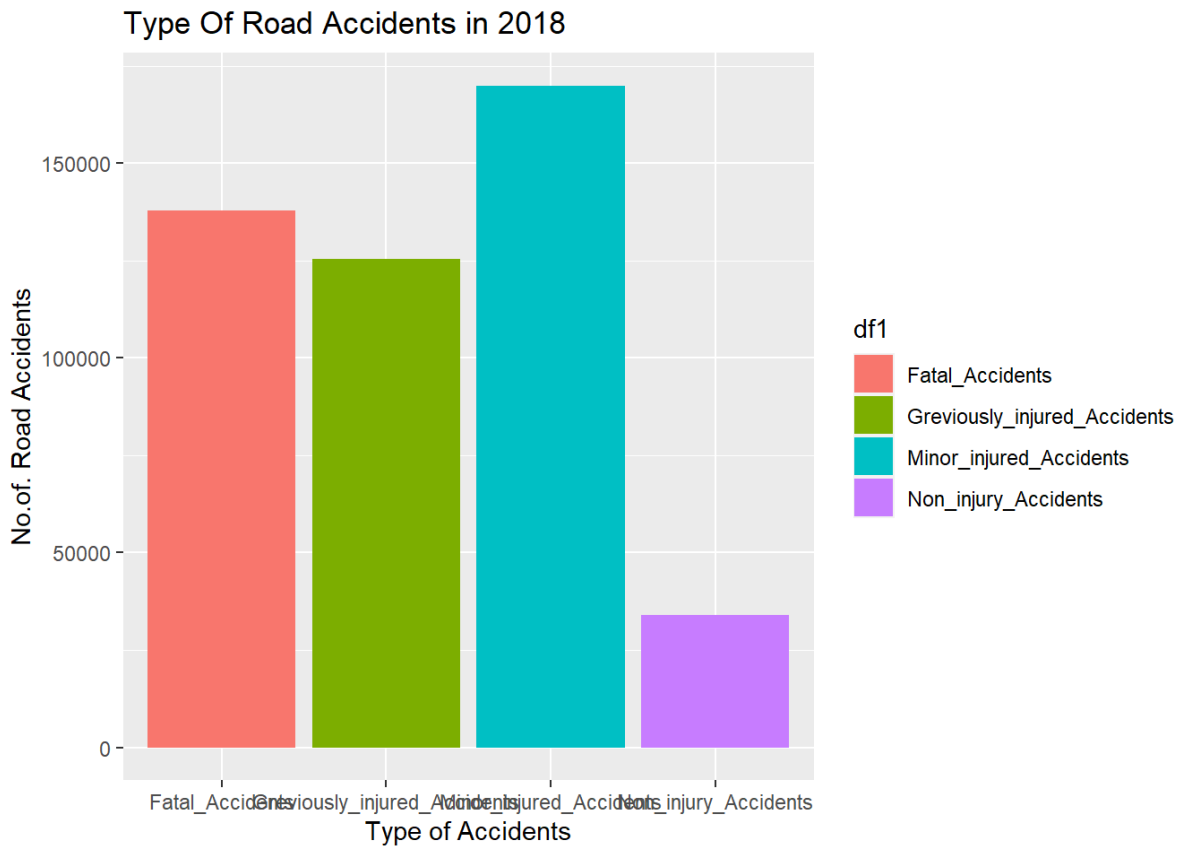
```
df3<-data.frame(df1,df2$X37)

View(df3)


##plotting Pie chart

mypal<-brewer.pal(4,"Set2")

pie(df3$df2.X37,border = "white",col=mypal,labels = c("Fatal_Accidents","Gr
evious_injured_Accidents","Minor_injured_Accidents","Non_Injured_Accidents"
))
```



Inference:

The pie chart shows the various relationship between the parts divided about Total Accidents.

```
#barplot

mycol<-brewer.pal(4,"Set1")

s<-ggplot(df3,aes(x=df1,y=df2.X37,fill=df1))+geom_bar(stat="identity")+ggti
tle("Type Of Road Accidents in 2018")+xlab("Type of Accidents")+ylab("No.of
. Road Accidents")

s
```



Inference:

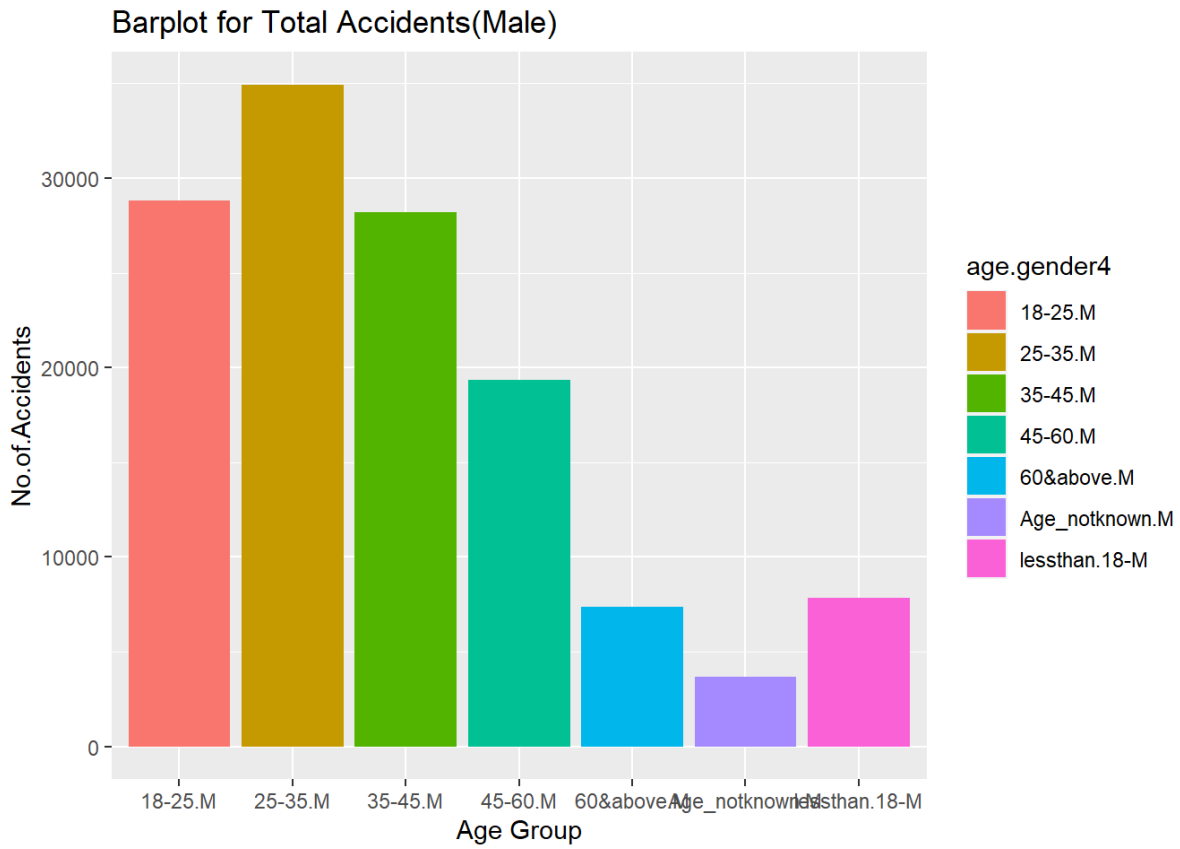
The above figure is the Type of Acccidents (fatal, Grevious, Minor injure and non-injury accidents).

Accidents with Minor Injury has occurred more in India in 2018.

```
##AGE AND GENDER WISE ROAD ACCIDENT

age_gender_data<-read.csv("C:/Users/Tenisha/Desktop/Accidents_dataset/Road-Accidents-2018--age_and_gender.csv")

age.gender1<-age_gender_data[37,]

age.gender2<-age.gender1[3:16]

age.gender3<-data.frame(t(age.gender2))

age.gender4<-c("lessthan.18-M","lessthan.18-F","18-25.M","18-25.F","25-35.M","25-35.F","35-45.M","35-45.F","45-60.M","45-60.F","60&above.M","60&above.F","Age_notknown.M","Age_notknown.F")

age.gender5<-data.frame(age.gender4,age.gender3$X37)

#barplot

p<-ggplot(age.gender5,aes(reorder(x=age.gender4,age.gender3.X37,fill=age.gender4),y=age.gender3.X37))+geom_bar(stat="identity",fill="orange")+coord_flip()+ggtitle("Age & Gender wise Accidents in 2018")+xlab("Age & Gender")+ylab("No Of Accidents")

## Male and Female accidents

##Male
```

```
male_data<-age.gender5[c(1,3,5,7,9,11,13),]

ggplot(male_data,aes(x=male_data$age.gender4,y=male_data$age.gender3.X37,fi
ll=age.gender4))+geom_bar(stat = "identity")+ggtitle("Barplot for Total Acc
idents(Male)")+xlab("Age Group")+ylab("No.of.Accidents")
```

```
## Warning: Use of `male_data$age.gender4` is discouraged. Use `age.gender4
` instead.

## Warning: Use of `male_data$age.gender3.X37` is discouraged. Use `age.gen
der3.X37`

## instead.
```



Inference:

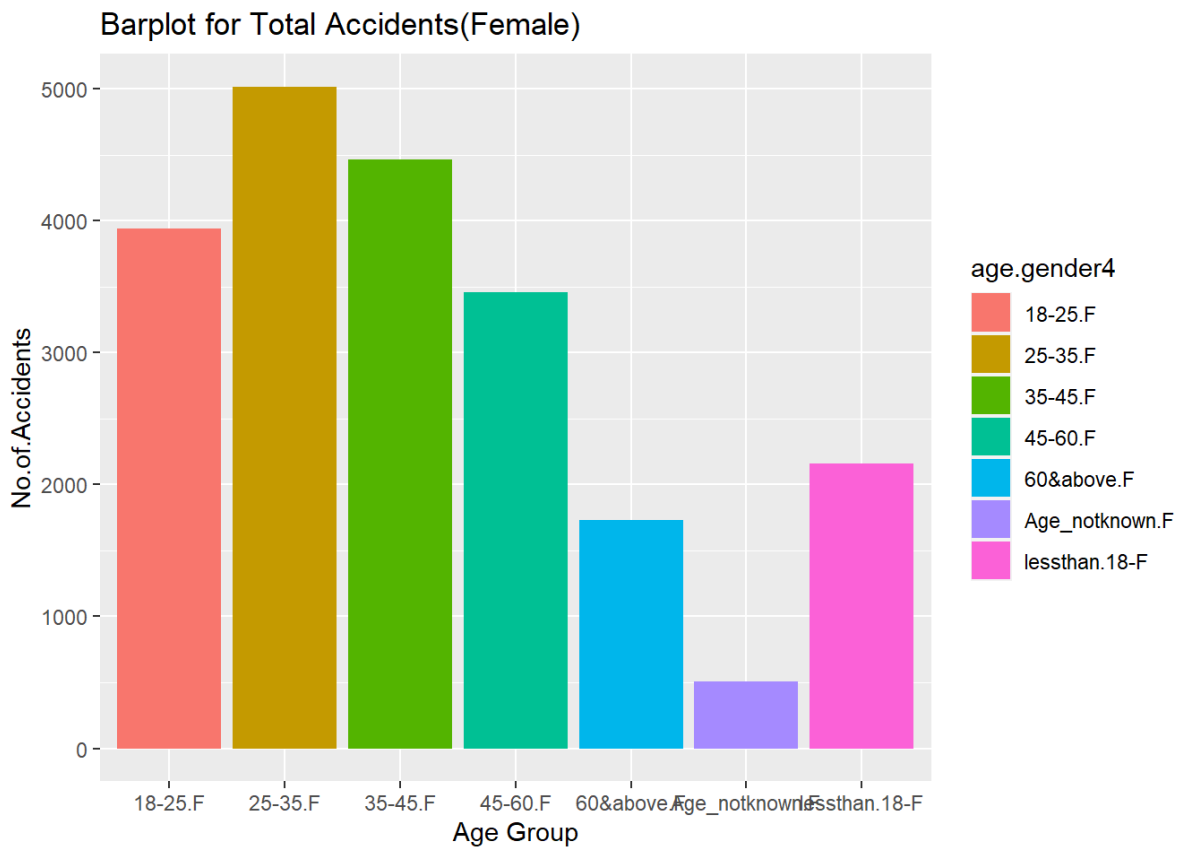
This Bar plot shows the the no of Accidents (Male)

25 – 35 Male is the age category where more Accidents occurred.

```
##Female

female_data<-age.gender5[c(2,4,6,8,10,12,14),]

ggplot(female_data,aes(x=female_data$age.gender4,y=female_data$age.gender3.
X37,fill=age.gender4))+geom_bar(stat = "identity")+ggtitle("Barplot for Tot
al Accidents(Female)")+xlab("Age Group")+ylab("No.of.Accidents")
```

```
## Warning: Use of `female_data$age.gender4` is discouraged. Use `age.gende
r4` instead.
```

```
## Warning: Use of `female_data$age.gender3.X37` is discouraged. Use `age.g
ender3.X37`

## instead.
```



Inference:

The above figure is the bar plot for Total Accidents (Female).

25 -35 Female is the age category where more accidents occurred.

```
#TRAFFIC VIOLATIONS

##loading dataset

traffic_violations<-read.csv("C:/Users/Tenisha/Documents/acci_data/Road-Acc
idents-2018-Traffic violations.csv")

View(traffic_violations)

library(dplyr)

is.na(traffic_violations)%>%sum()

## [1] 2

##removing unwanted rows and columns

#removing rows which contains total

data1<-traffic_violations[-37,]

##checking missing values

is.na(data1)%>%sum()
```

```
## [1] 0
```

```
##subsetting important columns for analysis
View(traffic_violations)
data2_total_accidents<-select(data1,c(2,3,10,15,20,25))
View(data2_total_accidents)%>%head()
```

```
## NULL
```

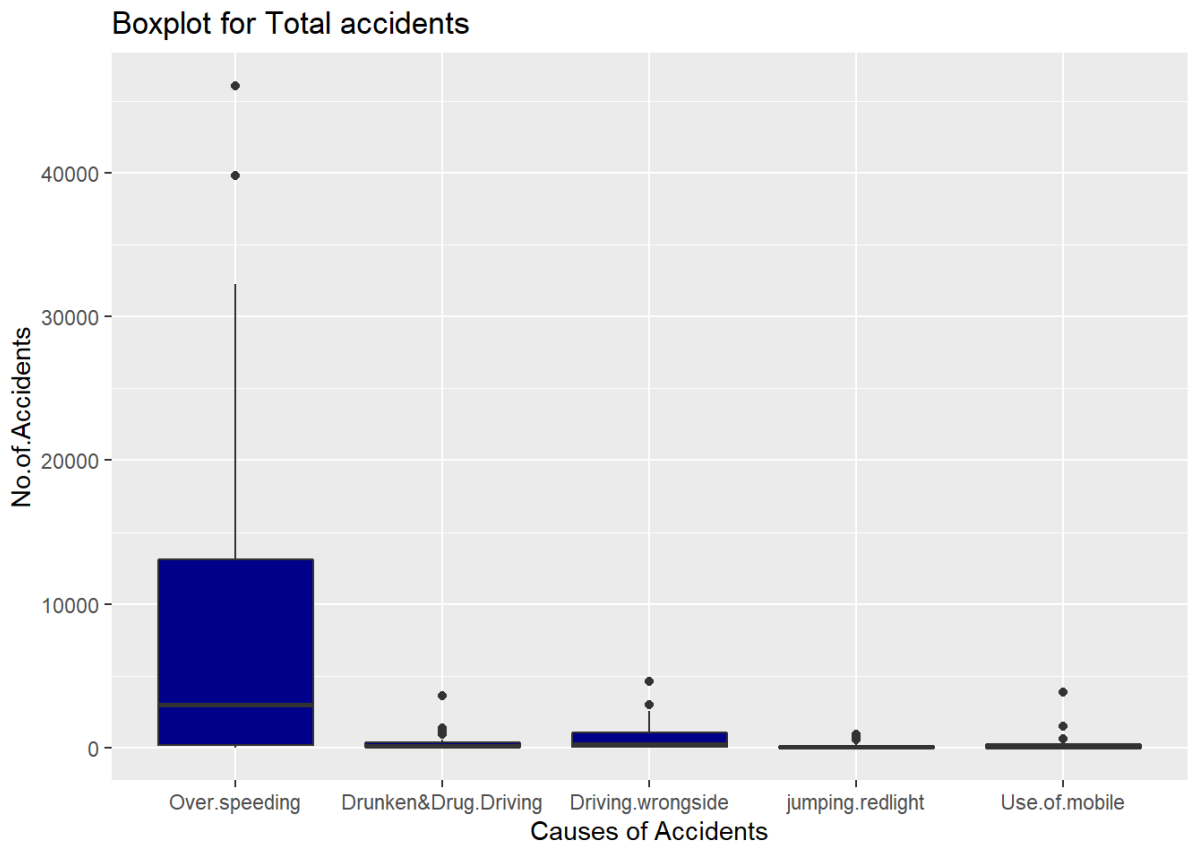
```
data3_total_killed<-select(data1,c(2,5,11,16,21,26))
View(data3_total_killed)


##boxplot


library(reshape2)
data5<-data2_total_accidents[-1]
colnames(data5)<-c("Over.speeding","Drunken&Drug.Driving","Driving.wrongsid
e","jumping.redlight","Use.of.mobile")
colnames(data5)
```

```
## [1] "Over.speeding"        "Drunken&Drug.Driving" "Driving.wrongside"
## [4] "jumping.redlight"     "Use.of.mobile"
```

```
data6<-melt(data5)
```

```
## No id variables; using all as measure variables
```

```
a<-ggplot(data6,aes(x=variable,y=value))+geom_boxplot(fill = "dark blue")+g
gtitle("Boxplot for Total accidents")
a
a+xlab("Causes of Accidents")+ylab("No.of.Accidents")
```



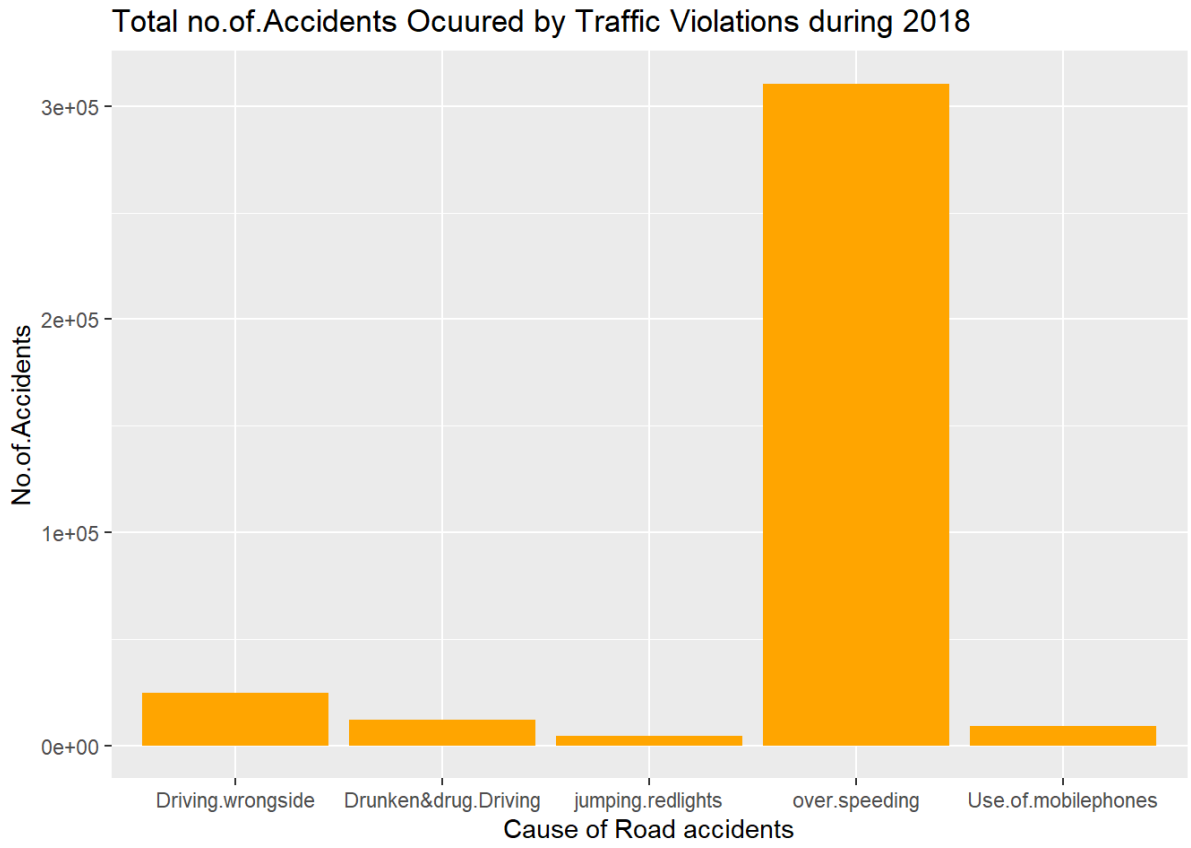
Inference:

The above figure is the Boxplot for Total Accidents (Fatal, Grievously and minor injured) for the year 2018.

```
##point plot
b<-ggplot(data6,aes(x=variable,y=value))+geom_point()
b
```

```
##barplot for total accidents occured by violating traffic signals
data7<-traffic_violations[37,]
##subsetting data
total_accidents<-select(data7,c(3,10,15,20,25))
View(total_accidents)
#transposing the datset
total_accident1<-t(total_accidents)
df1<-c("over.speeding","Drunken&drug.Driving","Driving.wrongside","jumping.
redlights","Use.of.mobilephones")
df2<-data.frame(total_accident1)
df3<-data.frame(df1,df2$X37)
```

```
a<-ggplot(df3,aes(x=df1,y=df2.X37))+geom_bar(stat = "identity",fill="orange
")+labs(x="Type of Cause",y = "No. Of Accidents Occured")


a+ggtitle("Total no.of.Accidents Ocuured by Traffic Violations during 2018"
)+xlab("Cause of Road accidents")+ylab("No.of.Accidents")
```

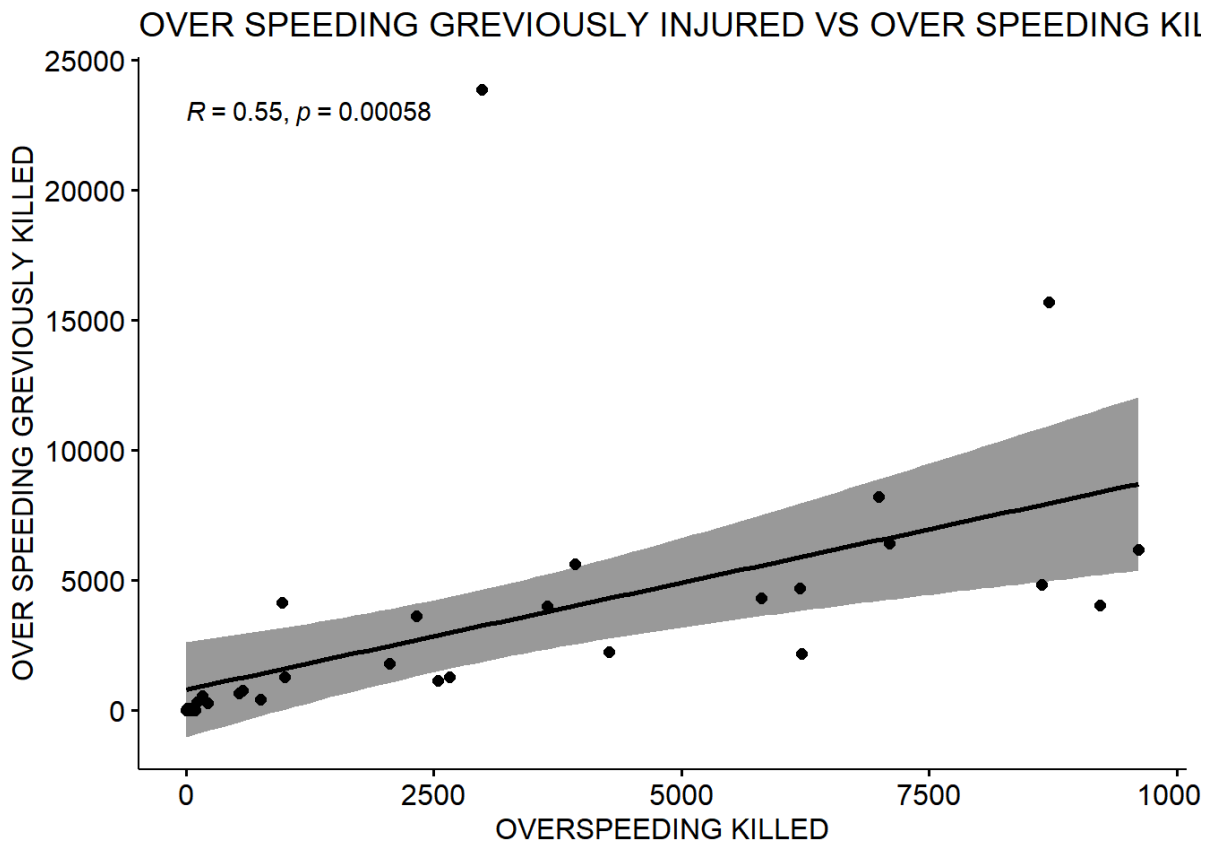


Inference:

The above bar plot shows the Total no of Accidents Occurred because of Traffic Violations.

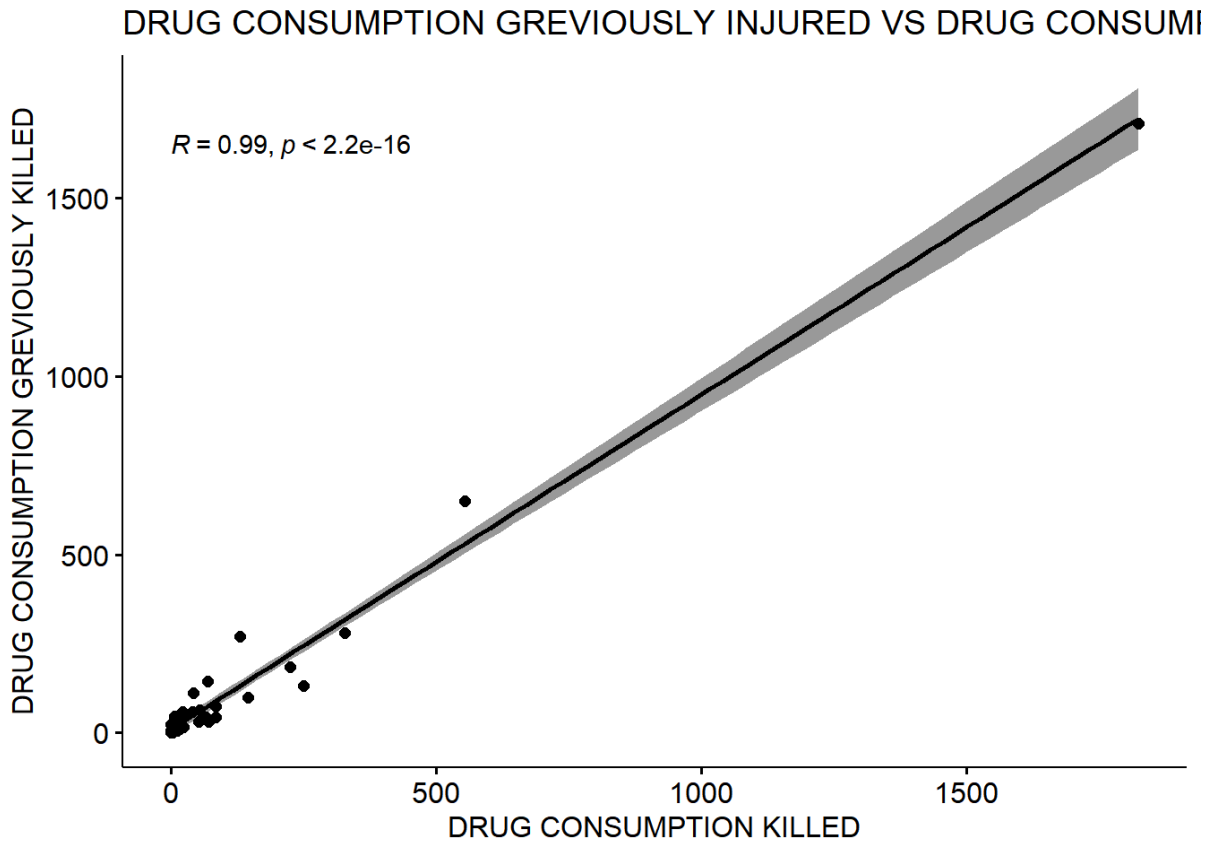
```
##scatterplot


#Overspeedng killed Vs Injured

ggscatter(data1,x="Over.Speeding...Persons.Killed...Number",y="Over.Speedin
g...Persons.Injured...Greviously.Injured",add = "reg.line",conf.int = TRUE,
cor.coef = TRUE,cor.method = "pearson")+ggtitle("OVER SPEEDING GREVIOUSLY I
NJURED VS OVER SPEEDING KILLED")+xlab("OVERSPEEDING KILLED")+ylab("OVER SPE
EDING GREVIOUSLY KILLED")
```

```
## `geom_smooth()` using formula 'y ~ x'
```




```
#Drug consumption killed Vs Greviously killed

ggscatter(data1,x="Drunken.Driving.Consumption.of.Alcohol...Drug...Persons.
Killed",y="Drunken.Driving.Consumption.of.Alcohol...Drug...Persons.Injured.
..Greviously.Injured",add = "reg.line",conf.int = TRUE,cor.coef = TRUE,cor.
method = "pearson")+ggtitle("DRUG CONSUMPTION GREVIOUSLY INJURED VS DRUG CO
NSUMPTION KILLED")+xlab("DRUG CONSUMPTION KILLED")+ylab("DRUG CONSUMPTION G
REVIOUSLY KILLED")
```

```
## `geom_smooth()` using formula 'y ~ x'
```



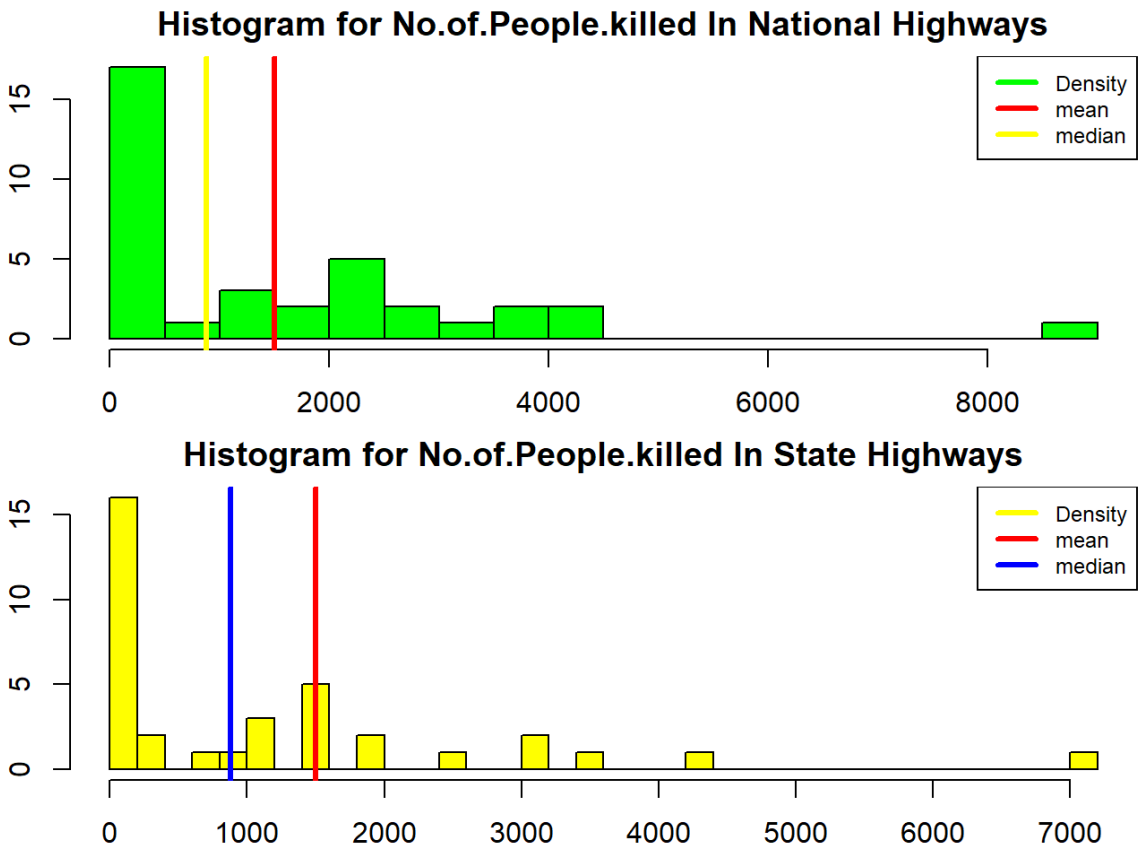

```
### barplot for no.of.persons killed


##subsetting data
##barplot for total accidents occured by violating traffic signals
data7<-traffic_violations[37,]
data7
]                                                    7878
##subsetting data
total_accidents<-select(data7,c(3,10,15,20,25))
View(total_accidents)
#transposing the datset
total_accident1<-t(total_accidents)
df1<-c("over_speeding","Drunken.driving_drug_consumption","Driving.wrongsid
e","jumping.red.lights","Use.of.mobile.phones")
df2<-data.frame(total_accident1)
df3<-data.frame(df1,df2$X37)
a<-ggplot(df3,aes(x=df1,y=df2.X37))+geom_bar(stat = "identity")+labs(x="Typ
e of Cause",y = "No. Of Accidents Occured")
```

```
a
```

```
a+ggtitle("Total no.of.Accidents Ocuured by Traffic Violations during 2018"
)+xlab("Cause of Road accidents")+ylab("No.of.Accidents")
```

```
###NATIONAL & STATE HIGHWAYS


NH_killed<-read.csv("C:/Users/Tenisha/Documents/acci_data/national-highways
-killed.csv")
SH_killed<-read.csv("C:/Users/Tenisha/Documents/acci_data/statehighways-kil
led.csv")


##SLICING DATA


NH_killed.persons<-NH_killed[c(2,6)]
SH_killed.persons<-SH_killed[6]


##COMBINING DATA
##NH&SH
combined.SH.NH.killed<-cbind(NH_killed.persons,SH_killed.persons)
colnames(combined.SH.NH.killed)<-c("STATES/UTs","NH.KILLED","SH.KILLED")
combined.SH.NH.killed<-combined.SH.NH.killed[-37,]


##histogram for no of people killed in national highways
par(mfrow=c(2,1))
par(mar=rep(2,4))
hist(combined.SH.NH.killed$NH.KILLED,col = "green",breaks = 30,main = "Hist
ogram for No.of.People.killed In National Highways")
abline(v=mean(combined.SH.NH.killed$NH.KILLED),col="red",lwd=3)
abline(v=median(combined.SH.NH.killed$NH.KILLED),col="yellow",lwd=3)
legend(x="topright",c("Density","mean","median"),col=c("green","red","yello
w"),cex=0.75,lwd=c(3,3,3))
##histogram for no of people killed in State Highways
hist(combined.SH.NH.killed$SH.KILLED,col = "yellow",breaks = 30,main = "His
togram for No.of.People.killed In State Highways")
abline(v=mean(combined.SH.NH.killed$NH.KILLED),col="red",lwd=3)
abline(v=median(combined.SH.NH.killed$NH.KILLED),col="blue",lwd=3)
```

```
legend(x="topright",c("Density","mean","median"),col=c("yellow","red","blue
"),cex=0.75,lwd=c(3,3,3))
```



Inference:

The above figure show the histogram of total people killed in State highways and Nations Highways in 2018.

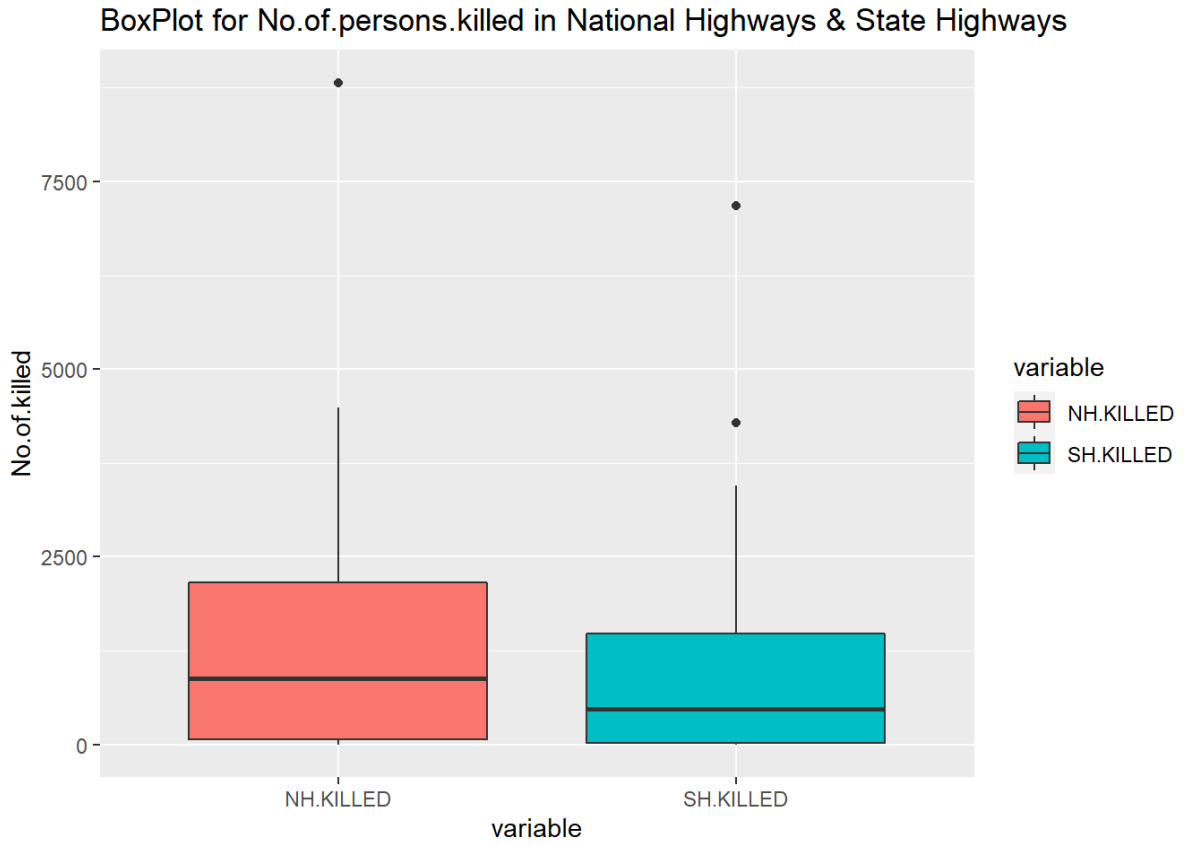
Both the Histogram are Positively skewed or right skewed which means most values are clustered around the left tail.

In the Histogram of people killed in National Highways, the value of mean is higher than median

In the Histogram of people killed in State Highways, the value of mean is higher than median

```
##Boxplot
library(reshape2)
View(combined.SH.NH.killed)
df<-combined.SH.NH.killed[-1]
df1<-melt(df)
## No id variables; using all as measure variables
```

```
a<-ggplot(df1,aes(x=variable,y=value,fill=variable))+geom_boxplot()+ggtitle
("BoxPlot for No.of.persons.killed in National Highways & State Highways")+
ylab("No.of.killed")

a
```



Inference:

This is the Boxplot for Total no of people killed in National Highways and State Highways.

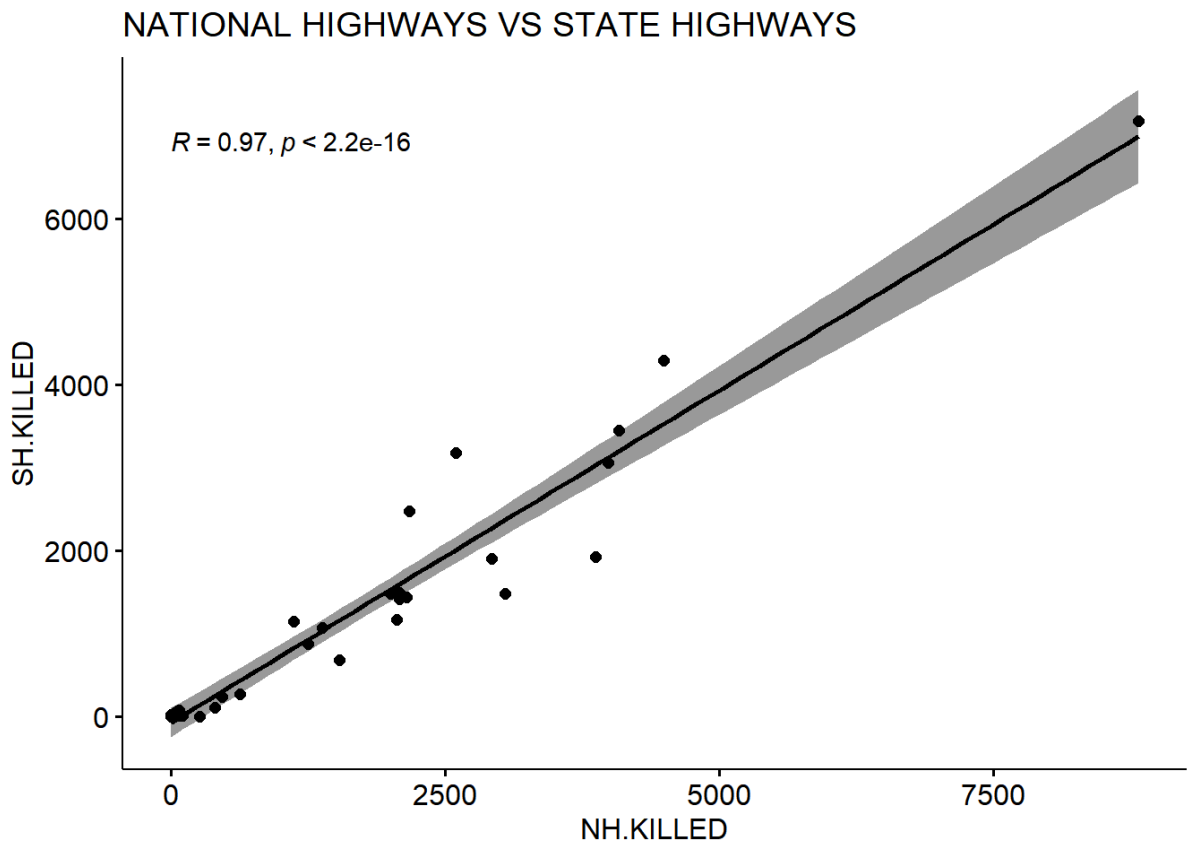
From the above observation it is clear that, the boxplot of State Highways is more consistent than National Highways.

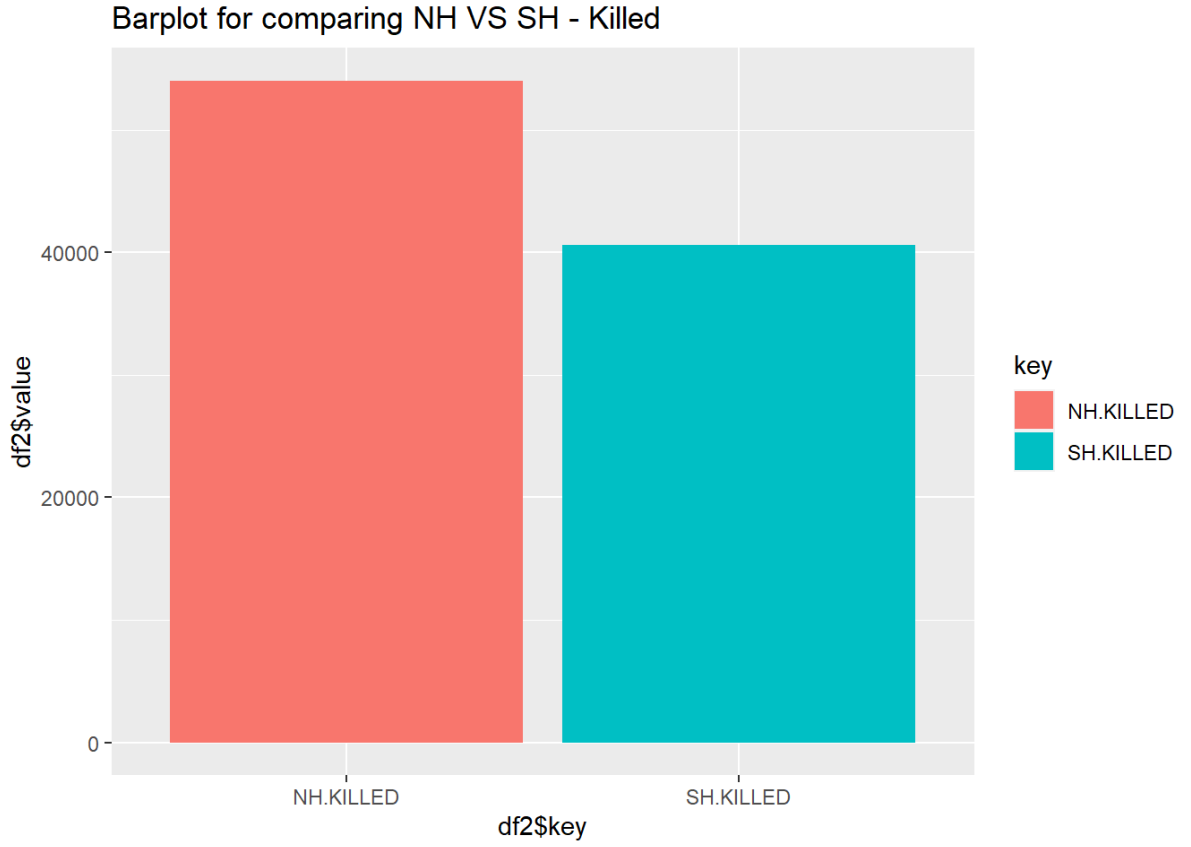
```
##barplot


df2<-gather(df)

ggplot(df2,aes(x=df2$key,y=df2$value,fill=key))+geom_bar(stat="identity")+g
gtitle("Barplot for comparing NH VS SH - Killed")
```

```
## Warning: Use of `df2$key` is discouraged. Use `key` instead.

## Warning: Use of `df2$value` is discouraged. Use `value` instead.
```

```
ggscatter(df,x="NH.KILLED",y="SH.KILLED",add = "reg.line",conf.int = TRUE,c
or.coef = TRUE,cor.method = "pearson")+ggtitle("NATIONAL HIGHWAYS VS STATE
HIGHWAYS")
```

```
## `geom_smooth()` using formula 'y ~ x'
```


NATIONAL HIGHWAYS VS STATE HIGHWAYS
R = 0.97, p < 2.2e-16
SH.KILLED
NH.KILLED
0
2000
4000
6000
0
2500
5000
7500


Barplot for comparing NH VS SH - Killed
df2$value
df2$key
NH.KILLED
SH.KILLED
0
20000
40000
key
NH.KILLED
SH.KILLED

```
```

Inference:

The above bar plot clearly shows the difference between the number of people killed in National highways and State Highways.

Total no of people killed in National Highways is more than State Highways.

INSIGHTS:

1. **Tamil Nadu, Madhya Pradesh, Karnataka, Uttar Pradesh and Andhra Pradesh** are top five states with large number of **Drivers injured without wearing helmet** in 2018
2. **Madhya Pradesh, Tamil Nadu, Kerala, Karnataka, Maharashtra** are the top five states with large number of **passengers injured without wearing** helmet in 2018.
3. By analysing the data, Without wearing helmet, Drivers Minor Injury Accidents occurred more in 2018
4. Less no of passengers without wearing helmet killed in 2018 comparing Drivers and Passengers data.
5. The histogram analysis of Accidents occurred without helmet (both drivers and passengers) is all positively skewed
6. **Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Karnataka and Rajasthan** are top five states with large number of **Drivers injured without wearing Seatbelt** in 2018.
7. **Madhya Pradesh, Tamil Nadu, Uttar Pradesh, Karnataka and Maharashtra** are top five states with large number of **Passengers injured without wearing Seatbelt** in 2018.
8. By comparing Drivers killed (both helmet & seatbelt), Drivers without wearing helmet are killed more than Drivers killed without wearing seatbelt.
9. By comparing Passengers killed (both helmet and Seatbelt), there is not much difference between the no of passengers killed.
10. By analysing Total Road Accidents (injured & Killed), **Tamil Nadu, Kerala, Madhya Pradesh, Uttar Pradesh and Karnataka** are the top five states with large no of people affected by road accidents.

11. In 2018, there are more no of Minor Injured Accidents that occurred frequently. Grievously Injured accidents and fatal accidents are also more in 2018.
12. Non – Injured Accidents occurred very less in 2018.
13. **25 – 35 years Male age groups** are more affected by accidents in 2018
14. **60 & above years**, **less than 18 years** and **age unknown** are the Victim's age categories that are less affected by road accidents in 2018.
15. **25 – 35 years Female age groups** are more affected by road accidents in 2018.
16. **60 & above years** and **Age unknown** are Female age groups that are less affected by road Accidents in 2018.
17. **Over speeding** had been the serious traffic violation in 2018. As many people are injured and killed due to Over speeding.
18. More People are killed in National Highways compared to State highways.
19. According to our analysis, many accidents are occurred in the month of May which is 9.49 %. And less accidents are occurred in the month of August which is 7.3 %.