

Deaths related to drug poisoning in England and wales in 2015



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Introduction

Drug poisoning deaths involve a broad spectrum of substances, including legal and illegal drugs, prescription type drugs (either prescribed to the individual or obtained by other means) and over-the-counter medications. Some of these deaths may also be from complications of drug abuse, such as deep vein thrombosis or septicaemia from intravenous drug use, rather than an acute drug overdose.

Drug-related death (DRD) figures, published by the national performance management framework, are used to monitor the performance of Drug (and Alcohol) Action Teams (D[A]ATs) in England and Wales with respect to reducing DRDs among drug abusers.

The dataset presented show deaths registered each year, rather than deaths occurring each year. Almost a coroner certifies all drug related deaths. Due to the length of time it takes a coroner to complete an inquest, around half of drug-related deaths registered in 2015 will have occurred prior to 2015. England and Wales level, general trends in drug-related deaths are broadly equivalent, regardless of whether the data is analyzed by year of occurrence or year of registration.

These datasets are part of the annual statistical bulletin on deaths related to drug poisoning in England and Wales.

The aim of this project is to analyze and examine the characteristics of deaths classified as drug-related and to obtain relevant information and using the program R, a program language and software for statistics and graphics.

Data Loading and Tidying

The datasets have been given in the .XLS file to be able to load the information given is necessary to change it into .CSV file each sheet in the .XLS file and install the package "readr".

```
library(readr)
tabel1 <- read_csv("D:/csv/tabel1.csv")
```

The main problem during the cleaning of the data was the values includes NA to exclude NA values need to use NA omits.

```
tabel1<-na.omit(tabel1)
```

Data manipulation and graphs

For the implementation of this part, we used several libraries of R to optimize the plots and to do it more efficiently. The libraries are the following.

```
library("ggplo2")  
library("readr")  
library("dplyr")  
library("plotly")
```

...

Most of the libraries do not come with the default program of R so it is necessary to install them with the command `install.packages("PackageName")`.

1. Number of deaths from drug-related poisoning and drug misuse, in England and Wales, deaths registered between 1993-2015

As shown in figure 1 in 2015 and 2014 are the highest number of deaths from drug related deaths recorded since 1999. The lowest death was recorded in 1993.

For data manipulation:

```
library(readr)  
tabel1 <- read_csv("D:/csv/tabel1.csv")  
tabel1<-na.omit(tabel1)  
tabel1<-t(tabel1)  
tabel1<-as.data.frame(tabel1)  
tabel1 <- tabel1[, -c(1:3,5,9,13,17:18,22,26,30:36)]  
tabel1<-`row.names<-`(tabel1,1:23)  
tabel1$`All drug poisoning` <- as.numeric(as.character(tabel1$`All drug  
poisoning`))
```

For plotting:

```
ggplot(tabel1, aes(x=tabel1$year, y=tabel1$`All drug poisoning`, fill=factor(
tabel1$year))) + geom_bar(stat = "identity",aes(width=1)) + scale_fill_discrete(
name="year") + xlab("year") + ylab("number of deaths")+ggtitle("Number of
deaths from drug-related poisoning and drug\n misuse in England and Wales, de
aths registered\n between 1993-2015")
```

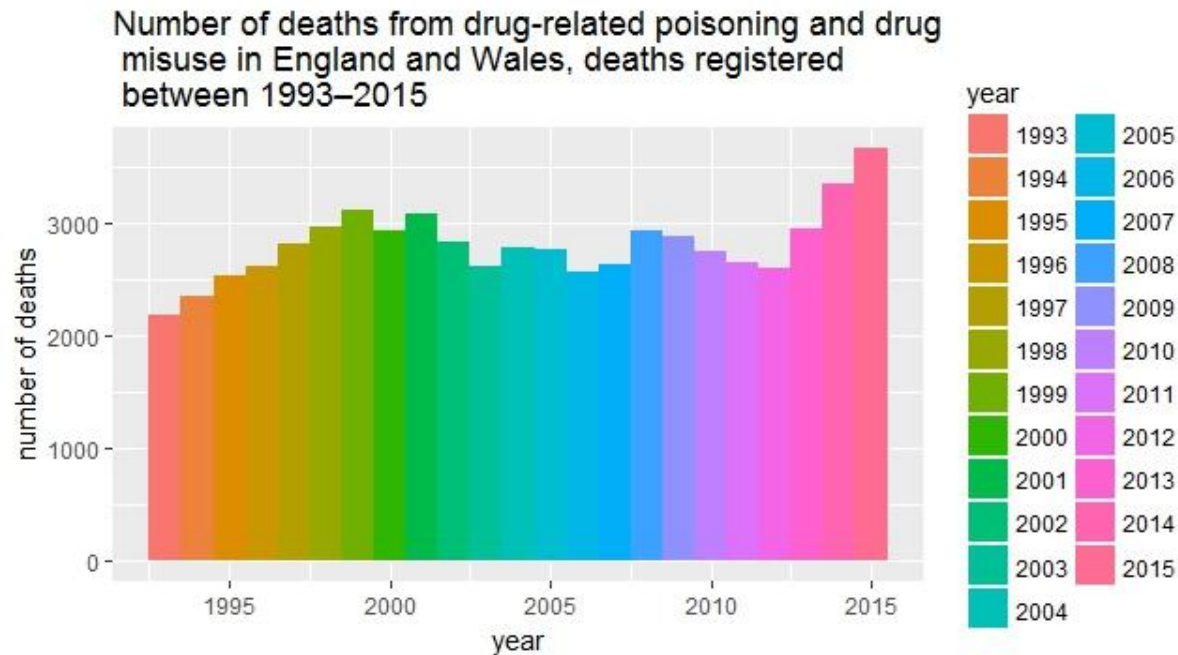


FIGURE 1 DEATH REGISTERED FROM 1993-2015

2. Number of deaths from drug-related poisoning and drug misuse significantly high in 2015

As shown in figure.2 there were 3,674 drug poisoning deaths involving both legal and illegal drugs registered in England and Wales in 2015, the highest since comparable records began in 1993. In 2015, there were 1,843 male drug misuse deaths and 636 female drug misuse deaths.

For data manipulation:

```
figure2<-select(tabel2,contains("2015"))
figure2<-figure2[c(2,7), ]
figure2[,2]<-"Gender"
figure2[1,2]<-"male"
figure2[2,2]<-"female"
colnames(figure2)<-c("Total","Gender")
```

For plotting:

```
ggplot(figure2, aes(x=figure2$Gender, y=figure2$Total,
fill=factor(figure2$Gender))) + geom_bar(stat = "identity",aes(width=0.8)) +
scale_fill_discrete(name="Gender") + xlab("") + ylab("number of
deaths")+ggtitle("Number of deaths from drug-related poisoning,In England and
Wales\n deaths registered in 2015")
```

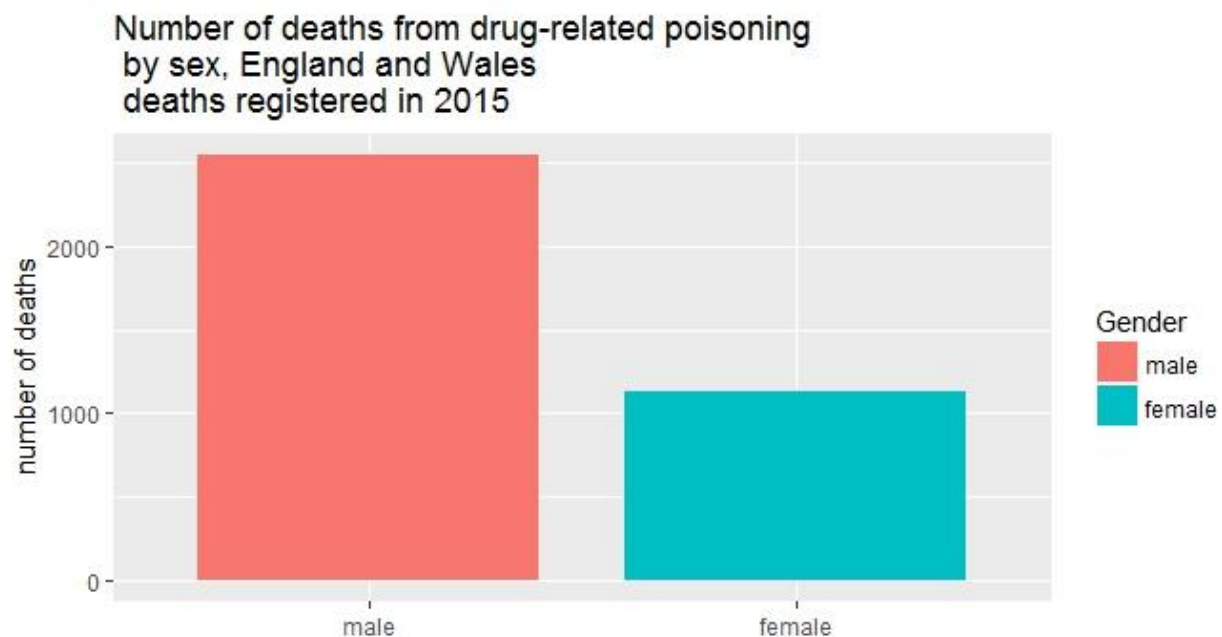


FIGURE 2 DEATH REGISTERED IN 2015

3. Number of deaths from drug-related poisoning and drug misuse, registered in 2014 and 2015

As shown in Figure 3, of the 3,674 drug poisoning deaths in 2015, 2,479 (67%) were from drug misuse which involves illegal drugs. Therefore, the pattern of mortality from drug misuse closely matches the overall trend seen for all drug-related deaths and it increases with 1.4% when it compares with 2014.

For data manipulation:

```
figure4<-select(drugs,contains("2015"))
figure4<-figure4[c(10,13),]
figure4[,2]<-"cause"
figure4[1,2]<-"Drug misuse deaths"
figure4[2,2]<-"drug poisoning deaths"
colnames(figure4)<-c("# of deaths","cause")
```

For plotting:

```
plot_ly(figure4, labels = figure4$cause , values = figure4$`# of deaths`,
type = "pie") %>% layout(title = "deaths from drug-related poisoning and drug
misuse in 2015",xaxis=ax,yaxis=ax)
```

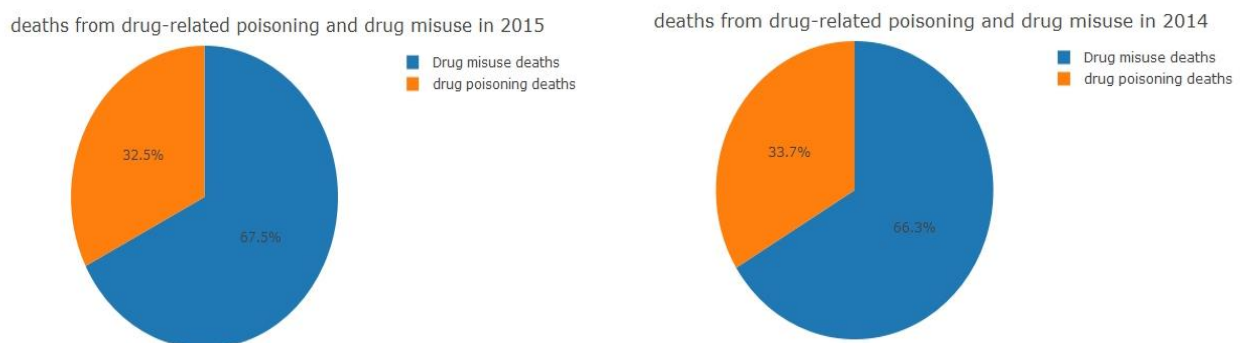


FIGURE 3,DEATHS FROM DRUG-RELATED POISONING AND DRUG MISUSE

4. mortality rate for deaths related to drug misuse, by sex, deaths registered in 1993 to 2015

Age-standardized mortality rates per 1 million population, standardized to the 2013 European Standard Population Cause of death was defined using the International Classification of Diseases, Ninth Revision (ICD-9) for the years 1993 to 2000 and Tenth Revision (ICD-10) from 2001 onwards. As shown in figure.4 the mortality rate of males is much higher than the mortality rate of females.

For data manipulation:

```
RATE<-select(tabel1,year,Males,Females)
RATE$Males <- as.numeric(as.character(RATE$Males))
RATE$Females <- as.numeric(as.character(RATE$Females))
RATE[,4]<-round((RATE$Males/35728)*1000000)
RATE[,5]<-round((RATE$Females*35728)/1000000)
colnames(RATE)<-c("year","TMales","TFemales","Males","Females")
```

For plotting:

```
ggplot(data = RATE, aes(x =RATE$year)) + geom_line(aes(y = RATE$Males, colour = "males rate")) + geom_line(aes(y = RATE$Females, colour = "females rate")) + scale_colour_manual("", breaks = c("males rate", "females rate"),values = c("red", "green"))+ xlab("year") + scale_y_continuous("rate per million", limits = c(0,100)) + labs(title="Standardised mortality rate for deaths related to drug misuse\n , deaths registered in 1993 to 2015")
```

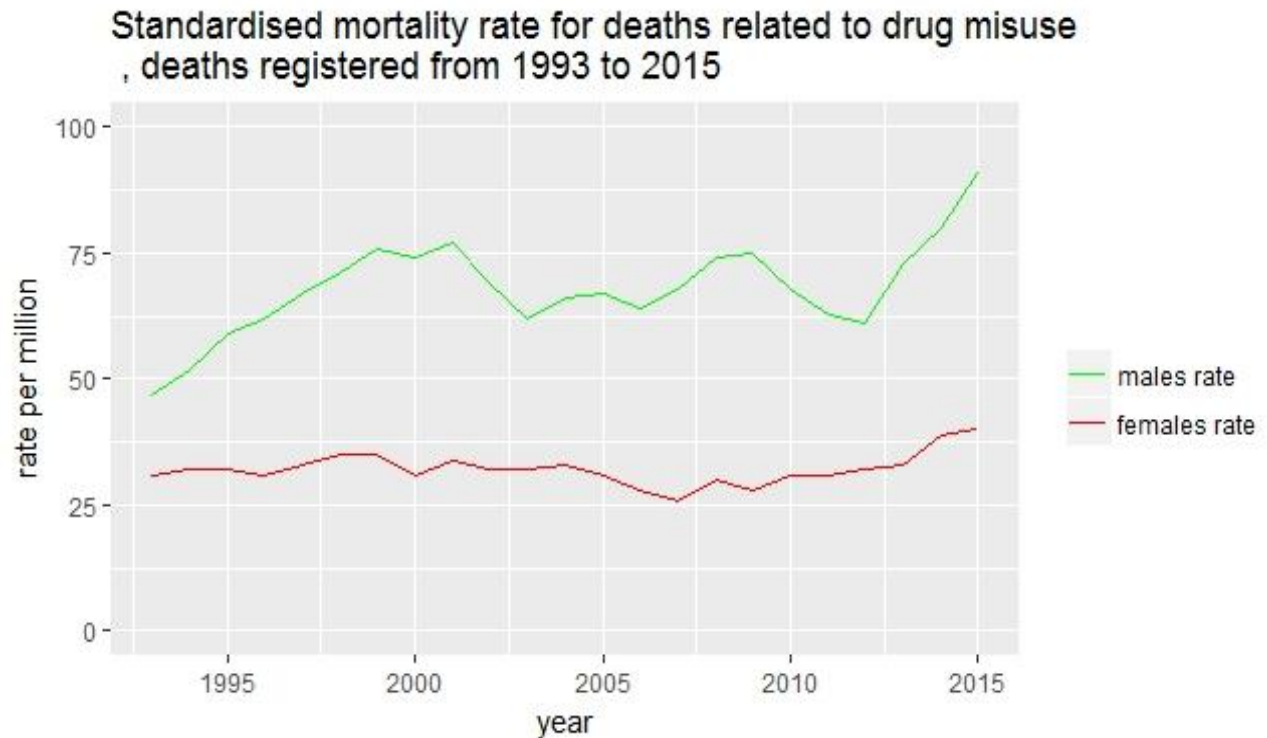



FIGURE 4 MORTALITY RATE PER MILLION PEOPLE

5. Deaths involving substances that are commonly abused in 2013 and 2015

Over half of all deaths related to drug poisoning in 2015 involved an opioid drug (excluding opioids which are contained in paracetamol compounds such as co-codamol). As shown in figure 6 2013 also have almost same opioid drug as 2015.

Opioid drugs include opiates that are derived from opium such as heroin and morphine and synthetic or semisynthetic opioids such as tramadol and fentanyl. They can be prescribed to treat moderate to severe pain, but repeated use can lead to dependence and tolerance (meaning the user needs to take more of the drug to achieve the same effect). These drugs also have psychoactive effects and many opioids are taken illicitly due to this high abuse potential.

For data manipulation:

```
Drug.substances.1<select(DRUG.substance,contains("substances"),contains("2013"),contains("2015"))
Drug.substances.1 <- Drug.substances.1[-c(18:45), ]
colnames(Drug.substances.1)<-c("Type","Total","Total1")
```

For plotting:

```
ggplot(Drug.substances.1, aes(x=reorder(Type, Total1), y=Total1, fill=factor(Type)))+ geom_bar(stat="identity") + coord_flip() + ylab("") + xlab("") + stat_summary(aes(label=round(..y..,2)), fun.y=mean, geom="text", size=3, vjust = 0.5, hjust = -0.1) + theme(legend.position = "none") + ggtitle("Drug-related deaths selected substances\n with alcohol,England and Wales\n ,deaths in 2015") + theme(plot.title = element_text(lineheight=.8,face="bold"))
```

```
ggplot(Drug.substances.1, aes(x=reorder(Type, Total), y=Total, fill=factor(Type)))+ geom_bar(stat="identity") + coord_flip() + ylab("") + xlab("") + stat_summary(aes(label=round(..y..,2)), fun.y=mean, geom="text", size=3, vjust = 0.5, hjust = -0.1) + theme(legend.position = "none") + ggtitle("Drug-related deaths selected substances\n with alcohol,England and Wales\n ,deaths in 2013") + theme(plot.title = element_text(lineheight=.8,face="bold"))
```

Drug-related deaths selected substances with alcohol, England and Wales, deaths in 2015

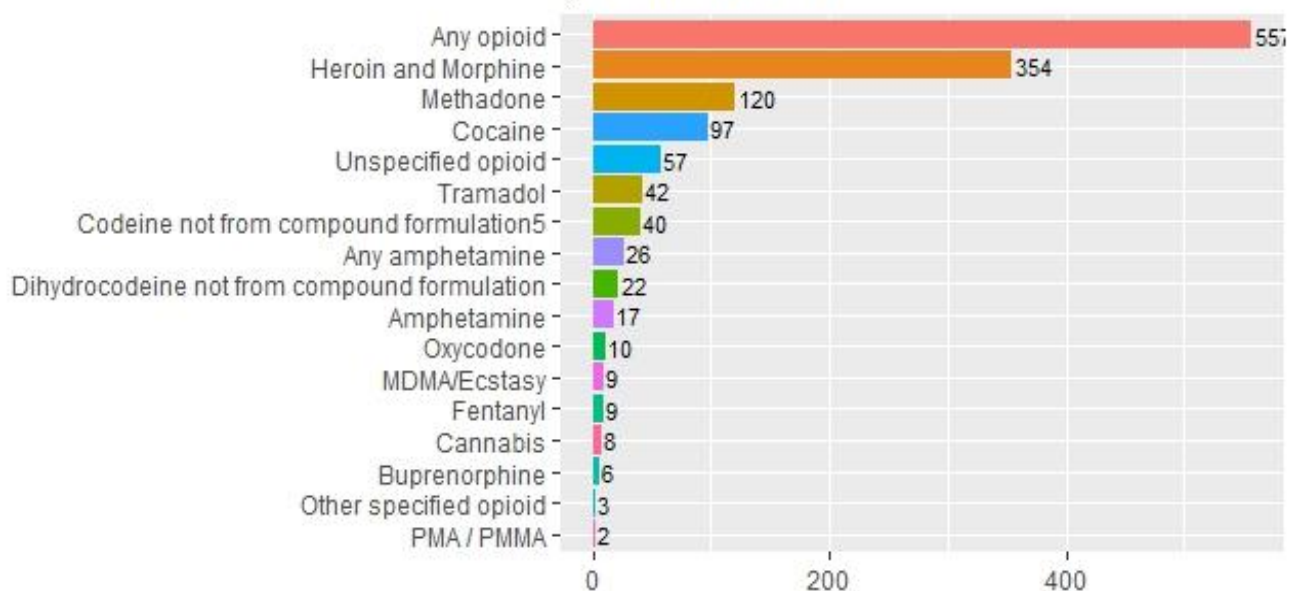


FIGURE 5 DEATHS INVOLVING SUBSTANCES

Drug-related deaths selected substances with alcohol, England and Wales, deaths in 2013

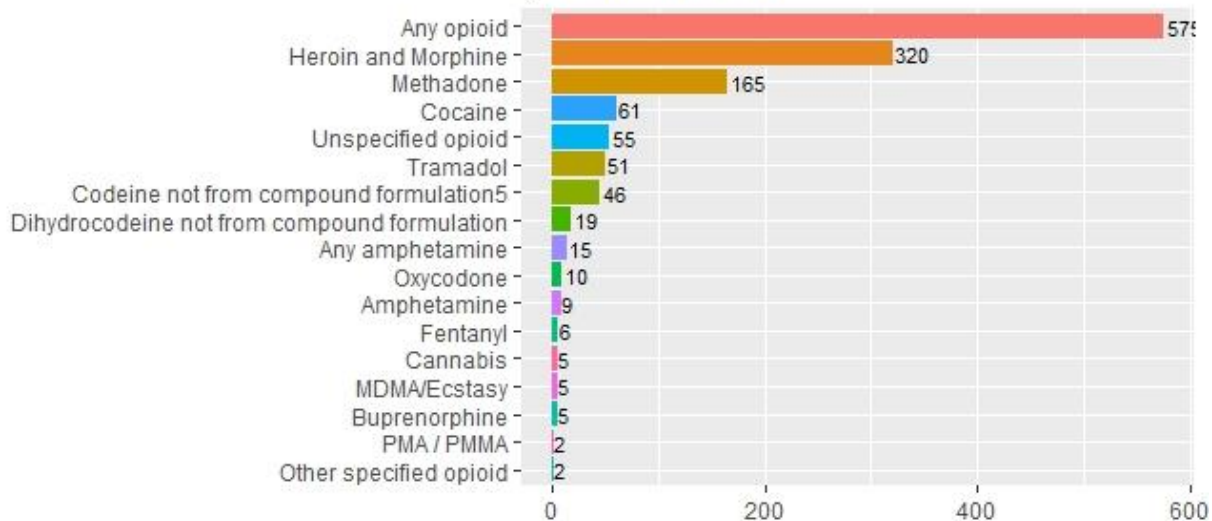


FIGURE 6 DEATH INVOLVING SUBSTANCES

6. Percentage of male and female drug misuse deaths registered in 2015

In both males and females, the largest proportion of drug misuse deaths were from accidental poisonings, though a greater proportion of male deaths are accidents (78.3% of male deaths and 63.1% of female deaths).

As shown in figure 8 & 9 Deaths from mental and behavioral disorders due to drug use only account for around 2% to 5% of drug misuse deaths. The proportion of drug-misuse deaths which are suicides (defined as intentional self-poisoning or poisoning of undetermined intent) is higher in females than in males - 34% in females compared with 17.5% in males in 2015

For data manipulation:

```
Death.drug<-select(tabel2,contains("year"),contains("2015"))
Death.drug<-Death.drug[c(3:5),]
Death.drug[1,1]<-"Mental and Behavioral disorder"
Death.drug[2,1]<-"Accidental poisoning"
Death.drug[3,1]<-"suicide"
colnames(Death.drug)<-c("cause","Total")
```

For plotting:

```
Death.drug$cause<-factor(Death.drug$cause,levels = Death.drug$cause)
plot_ly(Death.drug, labels = Death.drug$cause , values = Death.drug$Total,
type = "pie") %>% layout(title = "Percentage of male,drug misuse in
2015",xaxis=ax,yaxis=ax)
```

Percentage of male,drug misuse in 2015

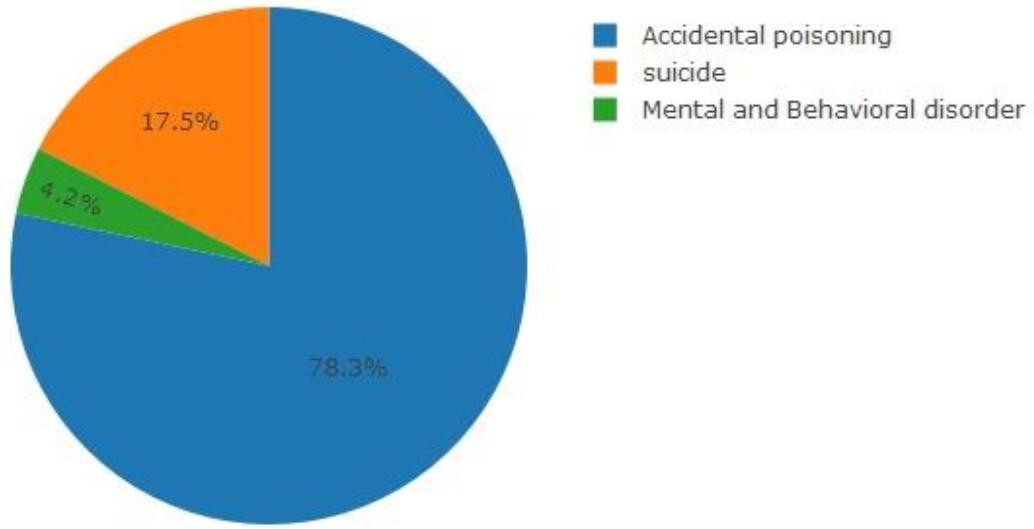


FIGURE 7, PERCENTAGE OF MALE DRUG MISUSE

Percentage of female,drug misuse in 2015

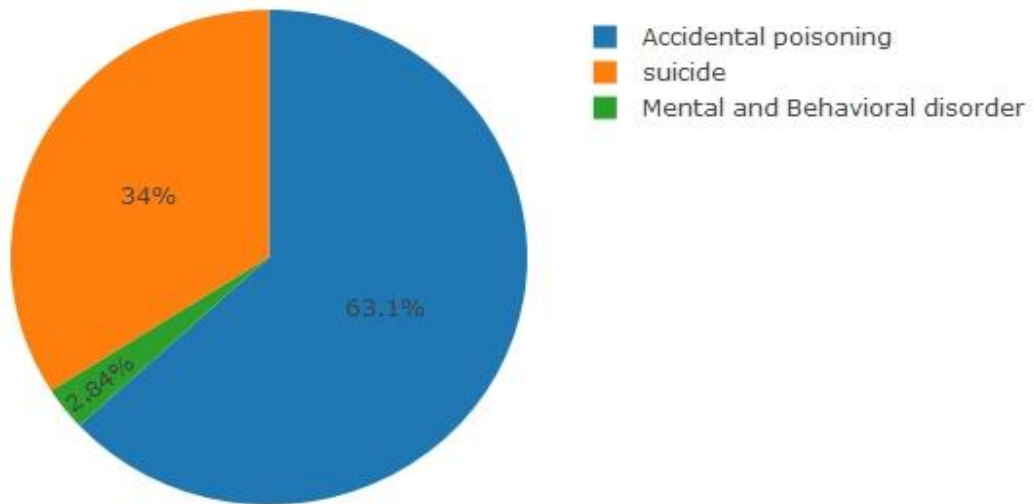


FIGURE 8, PERCENTAGE OF FEMALE DRUG MISUSE

References

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