

# Covid-19 effects on Unemployment Rates

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## Introduction

The Coronavirus has affected individuals throughout the globe. It has affected them mentally, emotionally, and financially. This project will focus on the financial impacts that COVID-19 has done by analyzing the correlation between unemployment rates and COVID-19 cases. Moreover, the scope of this study was to analyze the difference between the year of 2019 and 2020, individually, and compare them to when COVID-19 started, during March 2020. Having a control group (control dataset) allows for a more accurate analysis of the data and provides more accurate results. To be more specific, based on the hypothesis of our group, women are the most vulnerable in terms of unemployment rates, and this was studied by comparing and contrasting the unemployment for both genders during 2019 and 2020. The data set was then condensed and graphed for a better representation of the goals using R.

## Hypothesis

Typically, women's unemployment rate in the country is higher women's employment rate significantly impacted due to the fact that the industry/work sector that employs mostly women was directly affected by Covid 19; sectors such as hospitality and education More often than not, when schools and daycares were shut down, females, more than males, were expected to stay home and provide childcare

```
setwd("~/Desktop")
unemployment<-read.csv("unemployment_rates.csv")
new_cases<-read.csv("new_cases_covid.csv")

library("ggplot2")
library("ggpubr")
```

```
X<-c("1/01/19","2/01/19","3/01/19","4/01/19","5/01/19","6/01/19","7/01/19","8/1/19","9/01/19","10/01/19","11/01/19","12/01/19","1/01/20","2/01/20","3/01/20","4/01/20","5/01/20","6/01/20","7/01/20","8/1/20","9/01/20","10/01/20","11/01/20","12/01/20","1/01/21","2/01/21","3/01/21")
y<-as.Date(X,format = "%m/%d/%y")
unemployment[["Month"]]=y
colnames(unemployment)[colnames(unemployment)]=="Month"
```

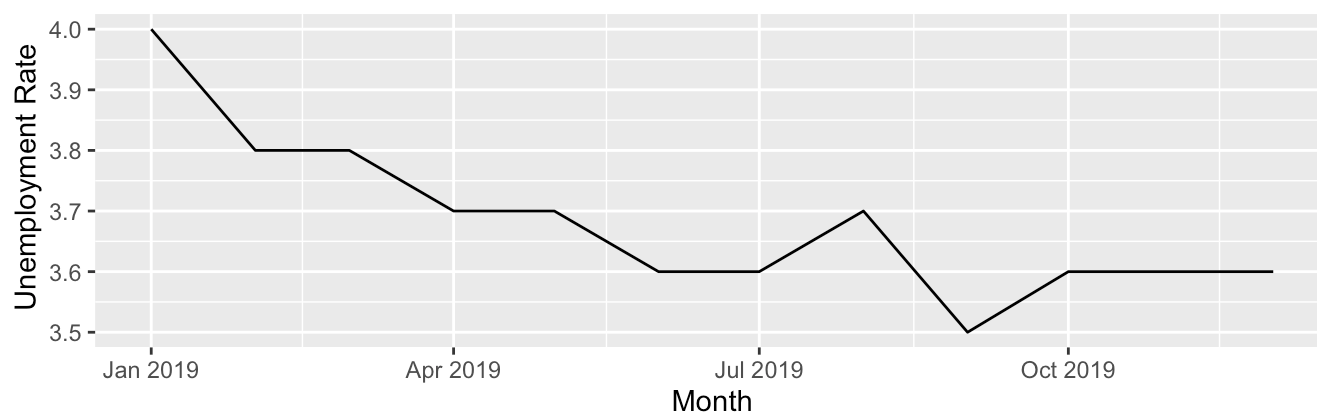
```
## [1] NA NA NA NA NA NA NA NA NA
```

## Unemployment Rates through 2019-2020 across different demographics

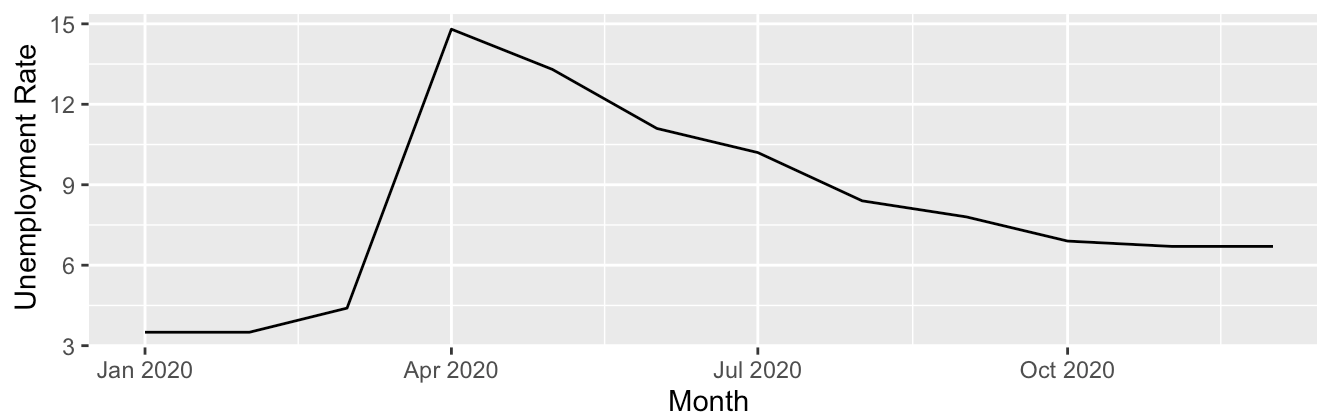
```
g1<-ggplot(unemployment[c(1:12),],aes(x=Month,y=Total))+geom_line(group=1)+ggtitle("Unemployment Rate Year throughout 2019")+labs(y=" Unemployment Rate")

g2<-ggplot(unemployment[c(13:24),],aes(x=Month,y=Total))+geom_line(group=1)+ggtitle("Unemployment Rate Year throughout 2020")+labs(y=" Unemployment Rate")
figure1<-ggarrange(g1,g2,
                    ncol = 1,nrow = 2)
figure1
```

Unemployment Rate Year throughout 2019

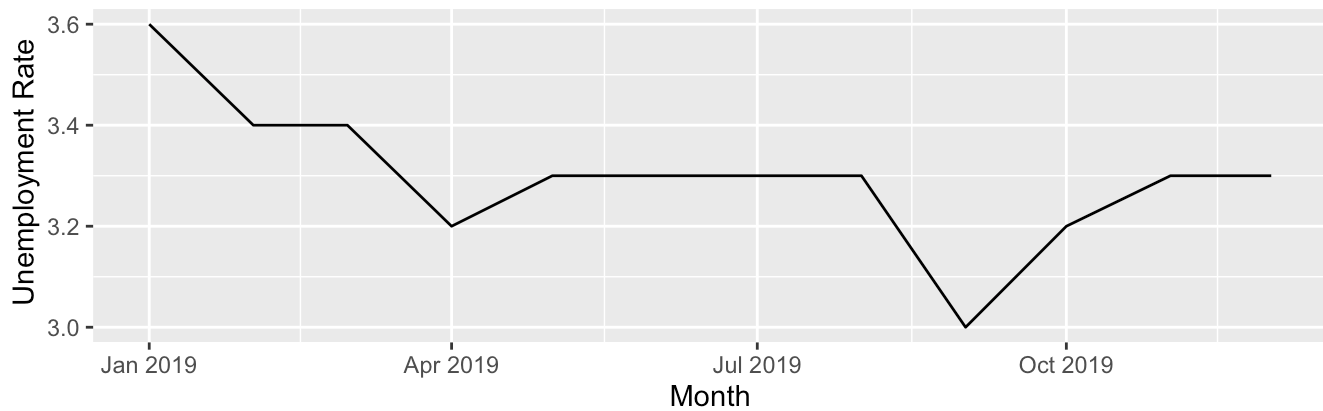


Unemployment Rate Year throughout 2020

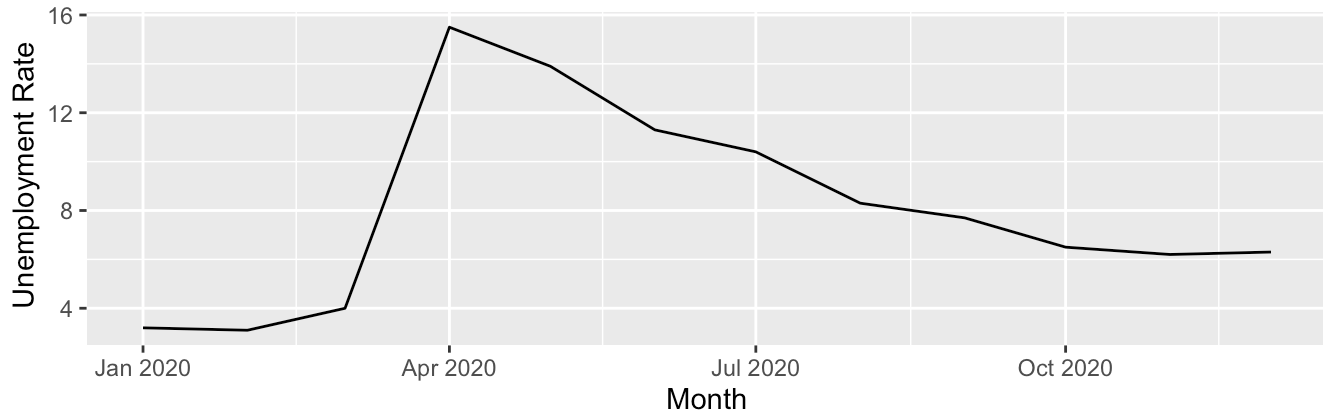


```
f1<-ggplot(unemployment[c(1:12),],aes(x=Month,y=Women))+geom_line(group=1)+ggtitle("Female Unemployment Rate Year throughout 2019")+labs(y=" Unemployment Rate")
f2<-ggplot(unemployment[c(13:24),],aes(x=Month,y=Women))+geom_line(group=1)+ggtitle("Female Unemployment Rate Year throughout 2020")+labs(y=" Unemployment Rate")
figure2<-ggarrange(f1,f2,
  ncol = 1,nrow = 2)
figure2
```

Female Unemployment Rate Year throughout 2019



Female Unemployment Rate Year throughout 2020

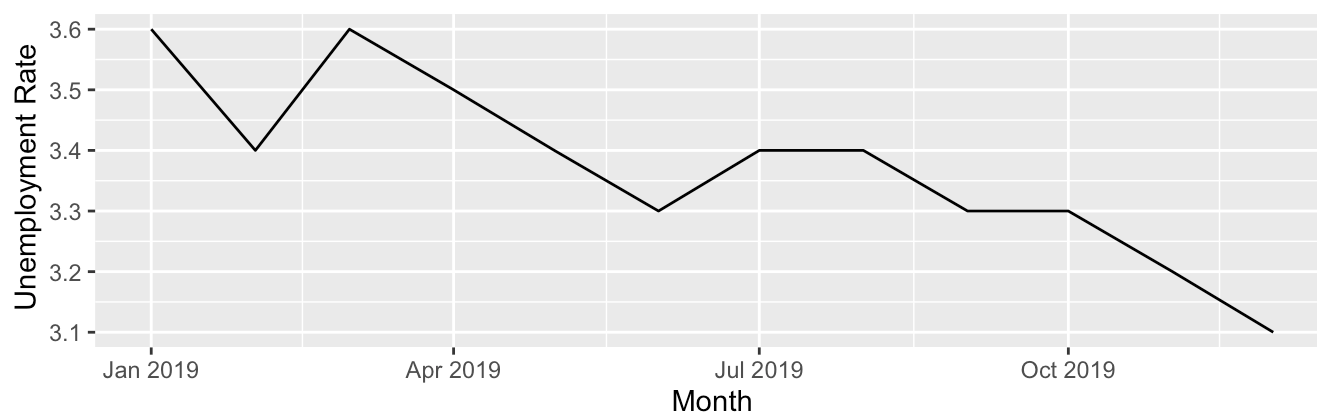


```

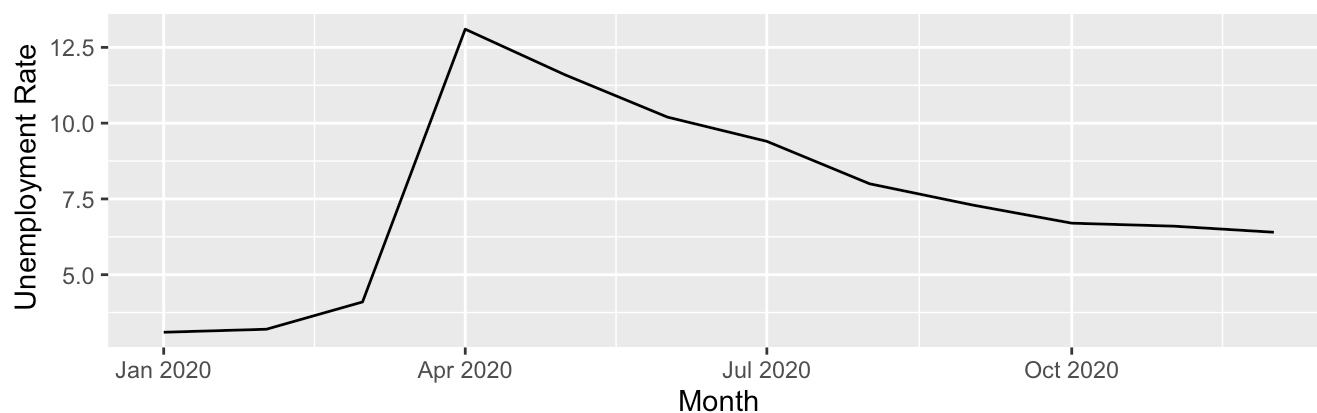
m1<-ggplot(unemployment[c(1:12),],aes(x=Month,y=Men))+geom_line(group=1)+ggtitle("Male Unemployment Rate Year throughout 2019")+labs(y=" Unemployment Rate")
m2<-ggplot(unemployment[c(13:24),],aes(x=Month,y=Men))+geom_line(group=1)+ggtitle("Male Unemployment Rate Year throughout 2020")+labs(y=" Unemployment Rate")
figure3<-ggarrange(m1,m2,
                    ncol = 1,nrow = 2)
figure3

```

Male Unemployment Rate Year throughout 2019



Male Unemployment Rate Year throughout 2020

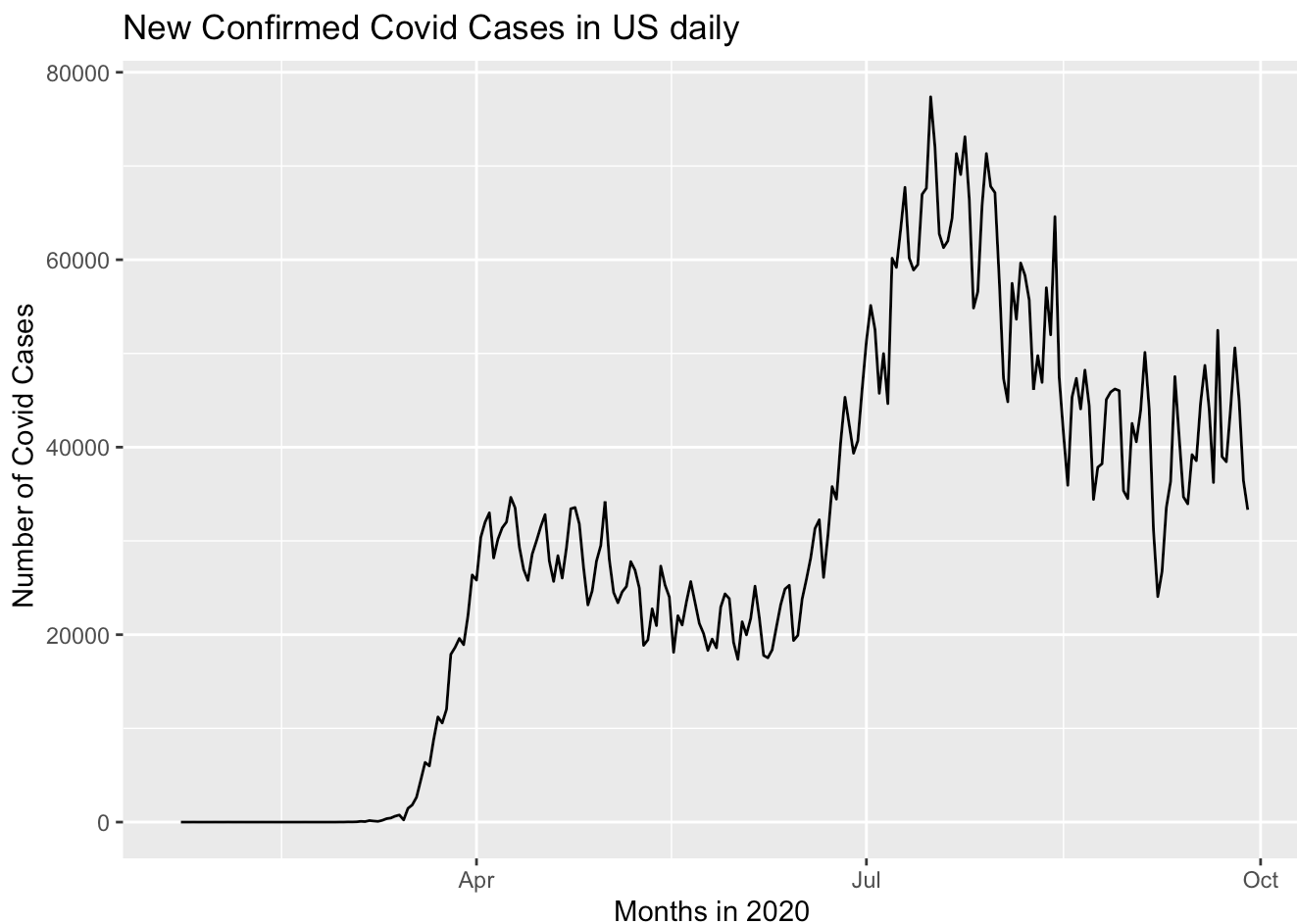


## Daily Confirmed new Cases of Covid

```
x<-as.Date(new_cases[,2])
```

```
Daily_count<-ggplot(new_cases,aes(x=x,y=new_cases_n))+
  geom_line(group=1)+ggtitle("New Confirmed Covid Cases in US daily")+labs(y=" Number
of Covid Cases",x="Months in 2020")
Daily_count
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```



```

January<-sum(new_cases[c(1:11),"new_cases_n"],na.rm = TRUE )
Febuary<-sum(new_cases[c(11:39),"new_cases_n"],na.rm = TRUE )
March<-sum(new_cases[c(40:70),"new_cases_n"],na.rm = TRUE )
April<-sum(new_cases[c(71:100),"new_cases_n"],na.rm = TRUE )
May<-sum(new_cases[c(101:131),"new_cases_n"],na.rm = TRUE )
June<-sum(new_cases[c(132:161),"new_cases_n"],na.rm = TRUE )
July<-sum(new_cases[c(162:192),"new_cases_n"],na.rm = TRUE )
August<-sum(new_cases[c(193:223),"new_cases_n"],na.rm = TRUE )
September<-sum(new_cases[c(224:251),"new_cases_n"],na.rm = TRUE )

months<-c(January,February,March,April,May,June,July,August,September)

total_unemployment_rates<-c(3.5, 3.5, 4.4, 14.8, 13.3, 11.1, 10.2, 8.4, 7.8)

relation_data<- data.frame(months,total_unemployment_rates)

Female_unemployment<-c(unemployment[c(13:21),4])
female_covid<-data.frame(Female_unemployment,months)

male_unemployment<- c(unemployment[c(13:21),3])
male_covid<-data.frame(male_unemployment,months)

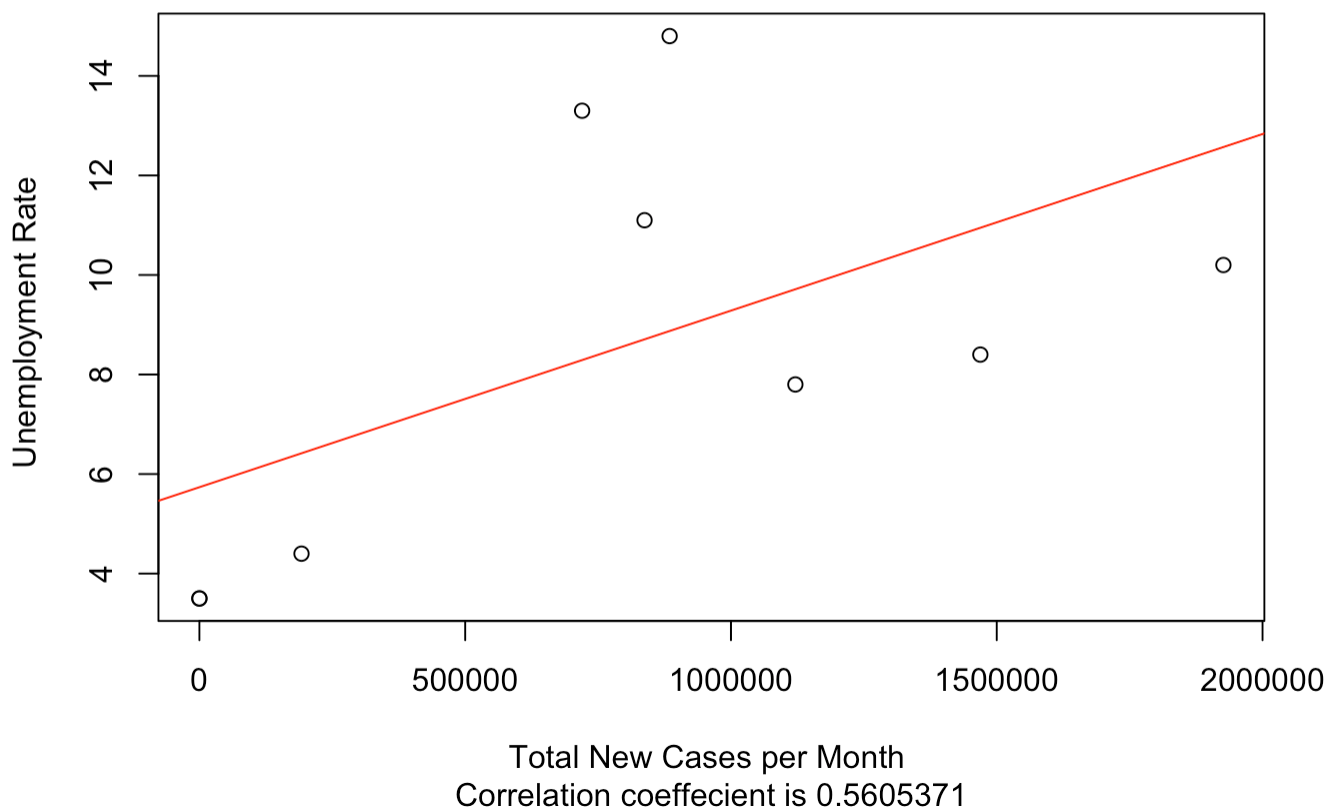
```

## Relationship between Unemployment rates

## and New Covid Cases

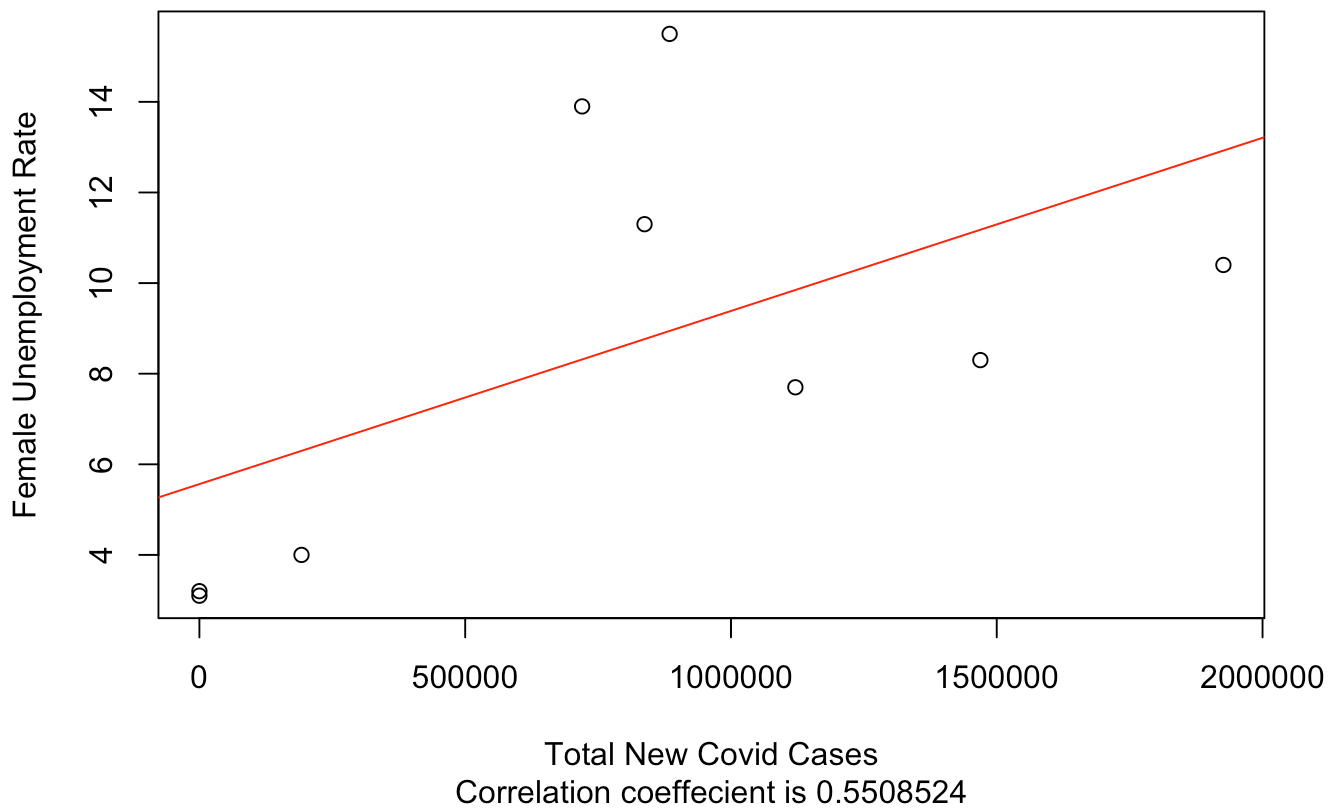
```
plot(relation_data$months,relation_data$total_unemployment_rates,
     xlab = "Total New Cases per Month ",
     ylab = "Unemployment Rate ",
     main = "Unemployment rate and Total New Covid Cases",
     sub = "Correlation coeffecient is 0.5605371")
abline(lm(total_unemployment_rates~months, data = relation_data), col="red")
```

### Unemployment rate and Total New Covid Cases



```
plot(female_covid$months,female_covid$Female_unemployment,
     main = "Female Unemployment rate and Total New Covid Cases",
     xlab = "Total New Covid Cases",
     ylab = "Female Unemployment Rate",
     sub = "Correlation coeffecient is 0.5508524")
abline(lm(Female_unemployment~months, data = female_covid),col="red")
```

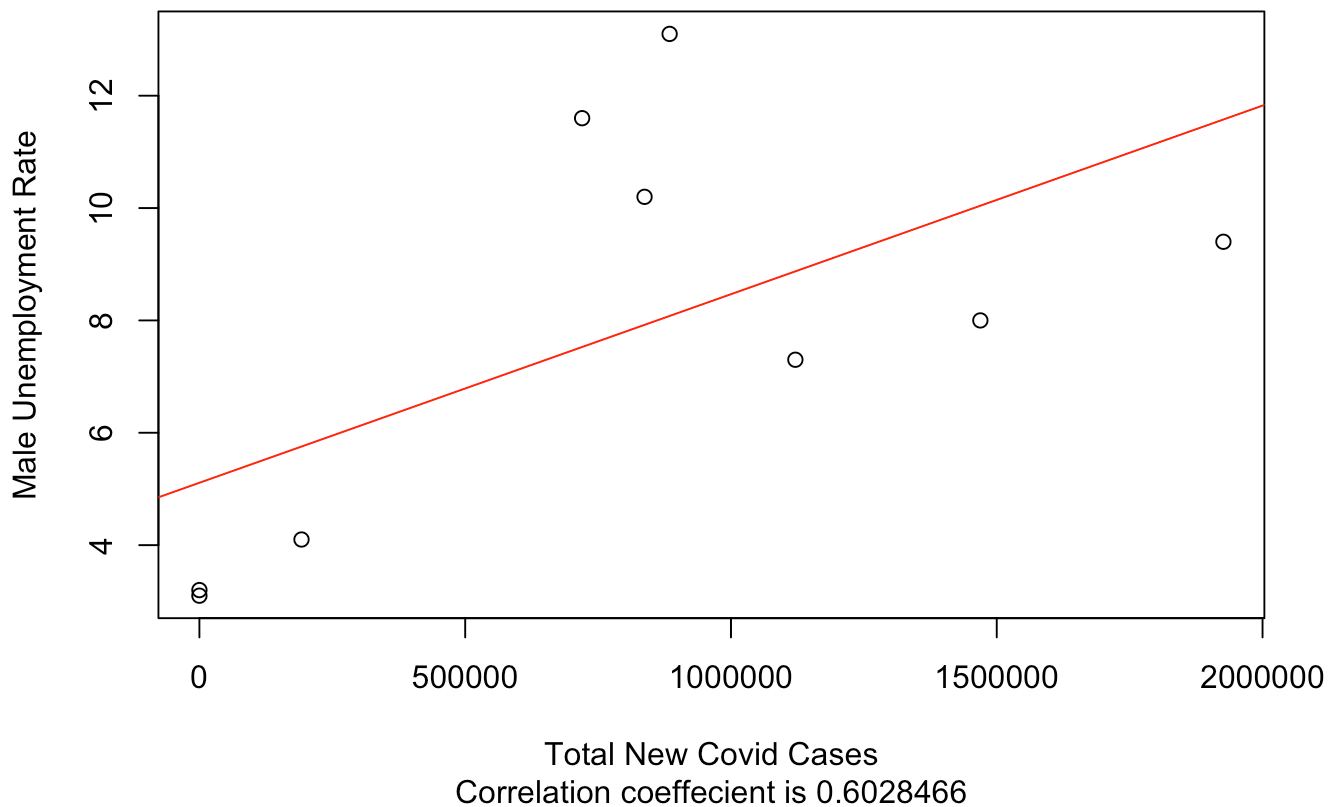
## Female Unemployment rate and Total New Covid Cases



```
plot(male_covid$months,male_covid$male_unemployment,  
     main = "Male Unemployment rate and Total New Covid Cases",  
     xlab = "Total New Covid Cases",  
     ylab = "Male Unemployment Rate",  
     sub="Correlation coeffecient is 0.6028466")  
abline(lm(male_unemployment~months,data = male_covid),col="red")
```



## Male Unemployment rate and Total New Covid Cases



## Analysis

After conducting and analyzing the dataset and graphing them, the drop in unemployment rates in the United States between the year of 2012 and 2019 is noticeable, rising from 3.6% in 2019 to near 15% in 2020. Furthermore, the pattern can be seen similarly when looking at male and female unemployment rates vs time (months). The rise in unemployment peaked during the month of April, and that is because when schools, nursing homes, and jobs were shut down. Additionally, women unemployment rate peaked almost 3% higher than men, which could be explained by the sectors that the majority of women work in, such as education and hospitality. Divulging more into this study, the daily confirmed COVID-19 cases represented a linear relationship with unemployment rates, in which, the higher the unemployment rate is, the higher the deaths, or COVID-19 cases. This, in addition, can explain that COVID-19 not only affected job loss, but lives loss too which indicated that unemployment rates rose during the highest daily COVID-19 cases.

## Conclusion

Analyzing the effects that COVID-19 had on the unemployment of men and women, our study focused on significant correlations between the data and statistics mentioned in our analysis and visually seen on our graphs. We had two main regions of data analysis: Male vs. Female unemployment rates compared from the years 2019 and 2020, and new Coronavirus cases correlated with male vs. female unemployment rates extracted from the year 2020. One of the main motivating factors behind analyzing this particular dataset had come about due to the fractionally large percentage of women who worked in occupations that had directly been affected by the Coronavirus. Through our analysis and comparison of the data, we found that this

correlation was indeed confirmed by the positive linear relationship in unemployment rate and new covid cases, where female unemployment brought a higher increase contrasting to that of male unemployment. Though the statistics illustrated a decrease between the unemployment of men and women, women's unemployment starkly stood above that of the mens, as mentioned in our analysis. Drawing back to our hypotheses before the study, our data and the correlation between the datasets has indeed confirmed that (I need more information before I can finish this conclusion, the information seems more unsupported then I'd want to write about.)

## Future Work

In the future we want to look at how other demographics were affected and continue to be affected by the pandemic. With more resources and time I think it would be interesting to look at how fast these different demographics recover from unemployment. Much of the younger population is comfortable assimilating back into the workforce but it may not be so easy for older people or women to just start working again. We may find that the unemployment rate will still remain higher than usual because vaccines roll out may not be fast enough and jobs have to pay enough for these people to want to start working again.

## References

Gender and unemployment: Lessons from the COVID-19 pandemic | UNCTAD. (2021).

UNCTAD.<https://unctad.org/news/gender-and-unemployment-lessons-covid-19-pandemic>

Karageorge, E. X. (2020, September 4). COVID-19 recession is tougher on women : Monthly Labor Review: U.S. Bureau of Labor Statistics. U.S. Bureau of Labor Statistic.<https://www.bls.gov/opub/mlr/2020/beyond-bls/covid-19-recession-is-tougher-on-women.htm>