Analysis of the Social and Political Factors for Success/Failure in Tackling the Covid-19 Pandemic

## Introduction

The Coronavious pandemic has led to social and economic disruption on an unprecidented scale with every country in the world being affected in some way. COVID-19 has dominated business, trade, politics and the media, leading many to question exactly what factors of a nation’s governence have lead to fewer COVD-19 deaths. Some of the most prevelent beleifes sorounding this include:

* Richer countries do better or worse at handling the pandemic than poorer countries.
* Countries led by women more successful than those led by men.
* The success in dealing with the pandemic related the proportion of older people living in a country.
* Democratic countries more successful at dealting with the pandemic than autoritrian ones.

By using data from countries around the world, namely relating to; wealth, age, the gender of a nation’s leader and the strength of democratic institutions as well as statisitcal analysis of these varibles, I am able to further understand the effect these vairbles have on the total deaths per million in a country. This will help me in determining the validity of these hypothesis or if they have no effect on the level of COVID-19 deaths at all (This is known as the null hypothesis).

## Justification:

### Countries led by women more successful than those led by men:

Maybe it is the type of leader that has an effect on COVID-19 deaths in a country? The early success of high profile female world leaders has been studied by academics and widely publicized by prominent media outlets. This leads to the hypothesis, Countries led by women are more successful than those led by men, and if so why? The behavior of male and female world leaders have been compared, with some studies claiming that female leader are “more risk-averse than men” and are more likely to downplay the crisis. While on the overhand Female leaders such as Jacinda Ardern and Angela Merkle were observed taking stricter measures to stop COVID-19 spreading earlier in the countries they led.

### Richer countries do better or worse at handling the pandemic than poorer countries:

It is not outlandish to assume that a nation with a wealthier population is likely to have access to better medical resources. The United Kingdom or Norway for example have high GDP per capitas, strong service economies and and sizable government infrastructure to plan for and potentially mitigate the effects of a pandemic in it’s population. These factors should also mean that measure put in place by a government such as lockdowns and working from home will have less of a financial impact on the population compared to countries which do not have robust medical and telecommunications infrastructure as well as having economies that rely on manufacturing or agriculture.

### The success in dealing with the pandemic related the proportion of older people living in a country:

Pandemics often have higher cases in the young but have a higher mortality rate in the elderly. A country with a larger proportion of older people in the population may be more likely to take fewer risks with its population and bring in stricter measures to mitigate the effect of the pandemic on the most vulnerable in the country.

### Democratic countries more successful at dealting with the pandemic than autoritrian ones:

Effective measures to controls the spread of COIVD-19 may be more difficult or slow to implement in liberal, Democratic political regimes. Measures such as travel bans and the limiting of social gatherings may be seen as autocratic by some members of the public and politicians alike. On the other hand, actual authoritarian regimes “may suffer from a lack of transparency and over-stringent responses.” Examples of such responses include media censorship and the falsification of data to control the population as well as the image of the country to the rest of the world. Such issues my cause distrust for a less transparent government’s COVID-19 policies and cause more deaths.

## The Results:

To actually prove that these hypotheses do or don’t effect COVID-19 deaths in countries I first began by examining the variables most relevant to each hypothesis individually, these can be found in Table 1. For use in later analysis I also get the measure of central tendency and dispersion for the variables, also listed in Table 1.

## Table

Understanding the

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Name of the Relevant MCT | Value of the MCT | Name of the Relevant MD | Value of the MD |
| Total Deaths Per Million | Continuous | 140.40 | variance and/or standard deviation | 209.88 |
| GDP Per Capita | Continuous | 14910.69 | variance and/or standard deviation | 16071.77 |
| Female Head of Government | Nominal | 0 (Male) = 107 1 (Female) = 9 | proportion in each category | 0 (Male) = 0.92 1 (Female) = 0.08 |
| V-Dem Polyarchy | Continuous | 0.56 | variance and/or standard deviation | 0.22 |

*Table 1. The Name of the Relevant Measure of Central Tendency (MCT) and Measure of Dispersion with their values*

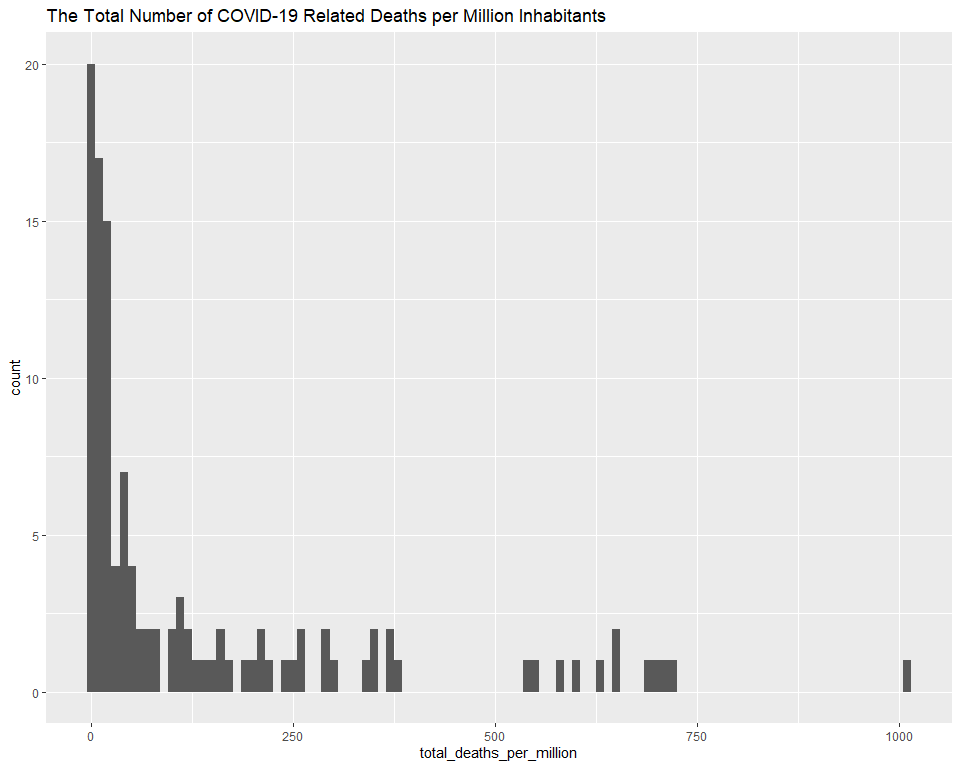


Figure 1.

## `stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.

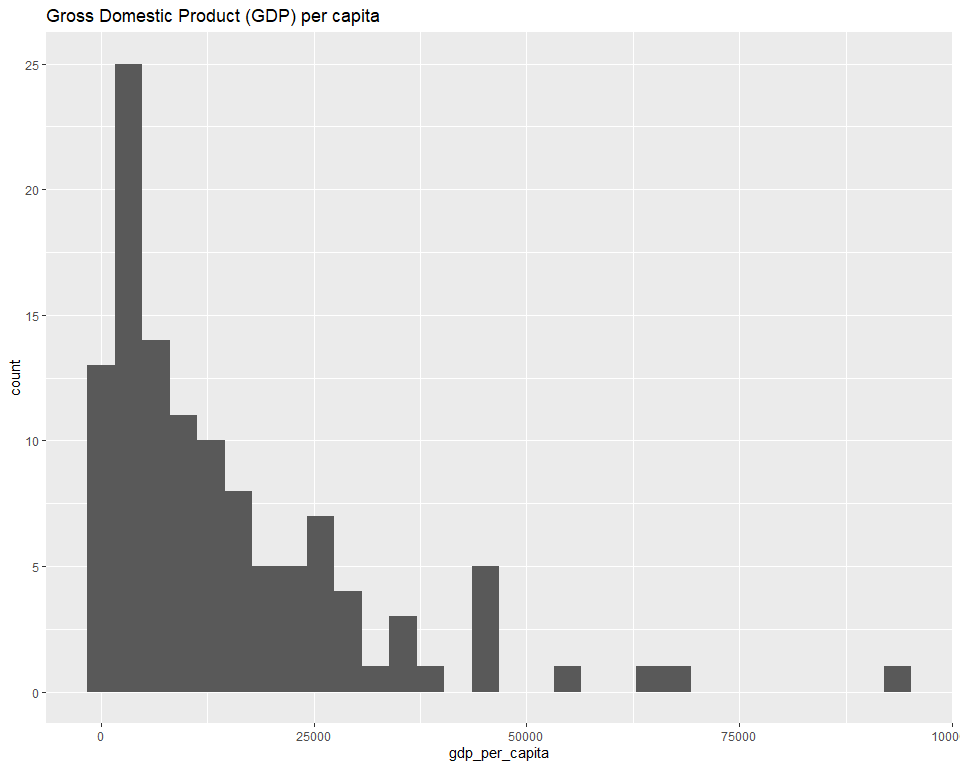


Figure 2.

## mapping: label = ~location   
## geom\_text: parse = FALSE, check\_overlap = FALSE, na.rm = FALSE  
## stat\_identity: na.rm = FALSE  
## position\_identity

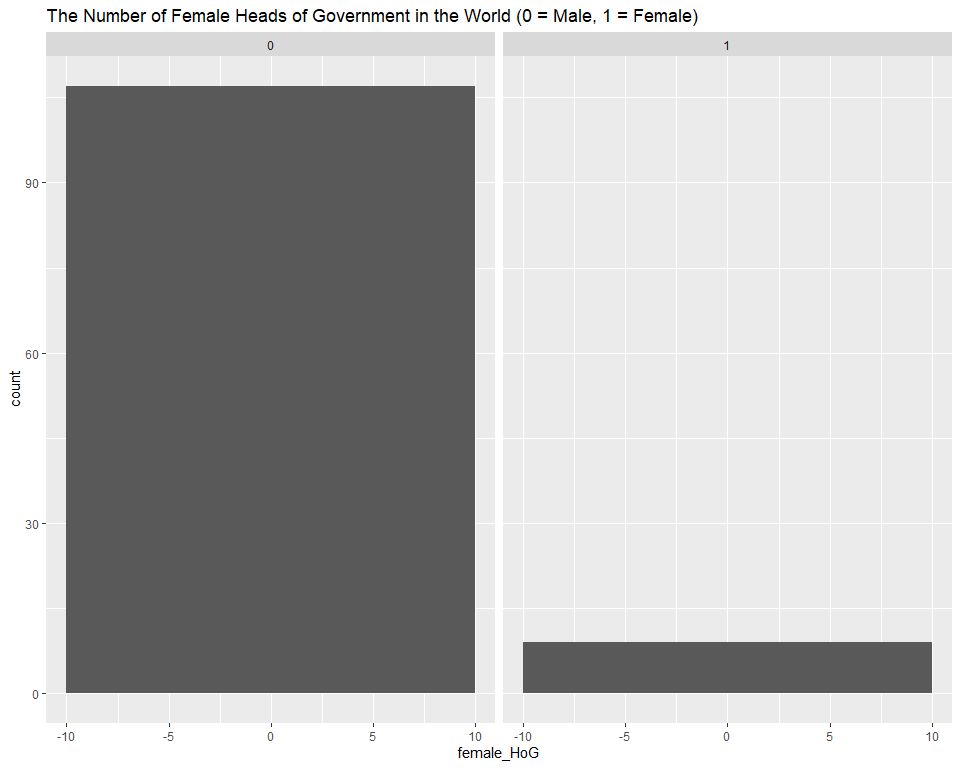


Figure 3.

## `stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.

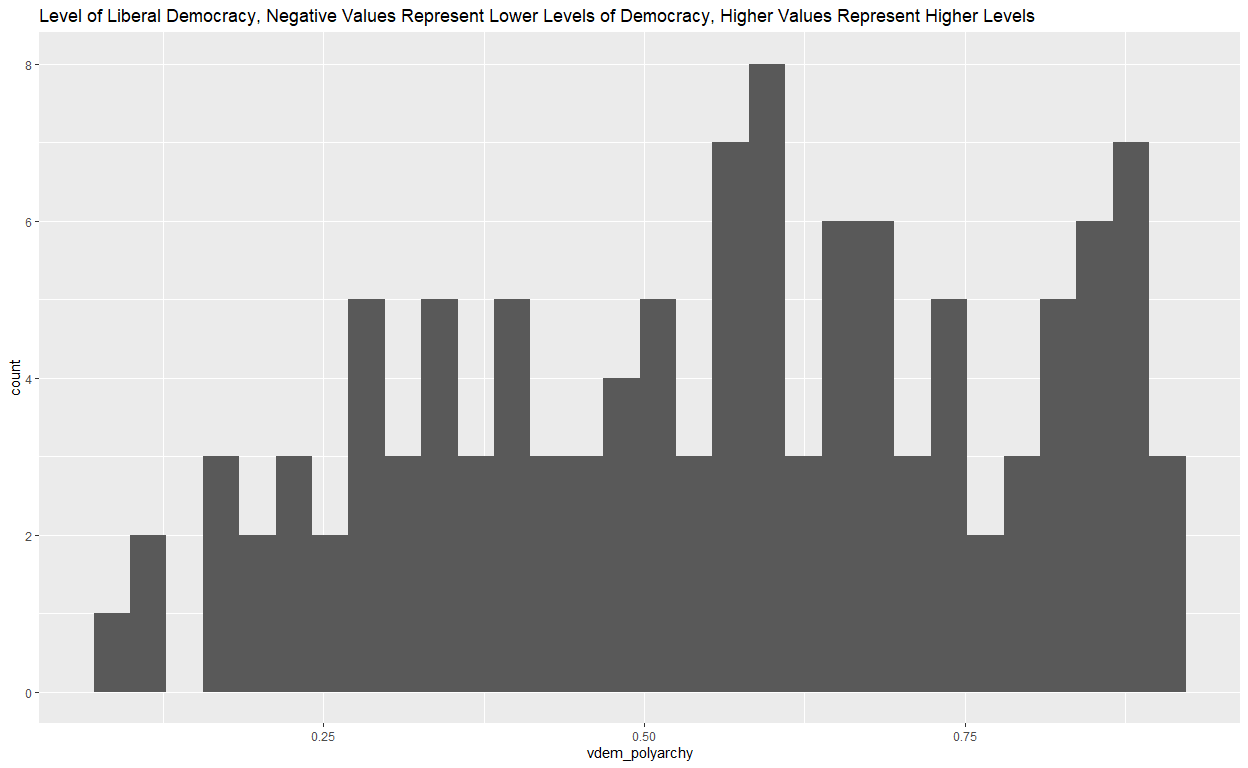


Figure 4.

## `stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.

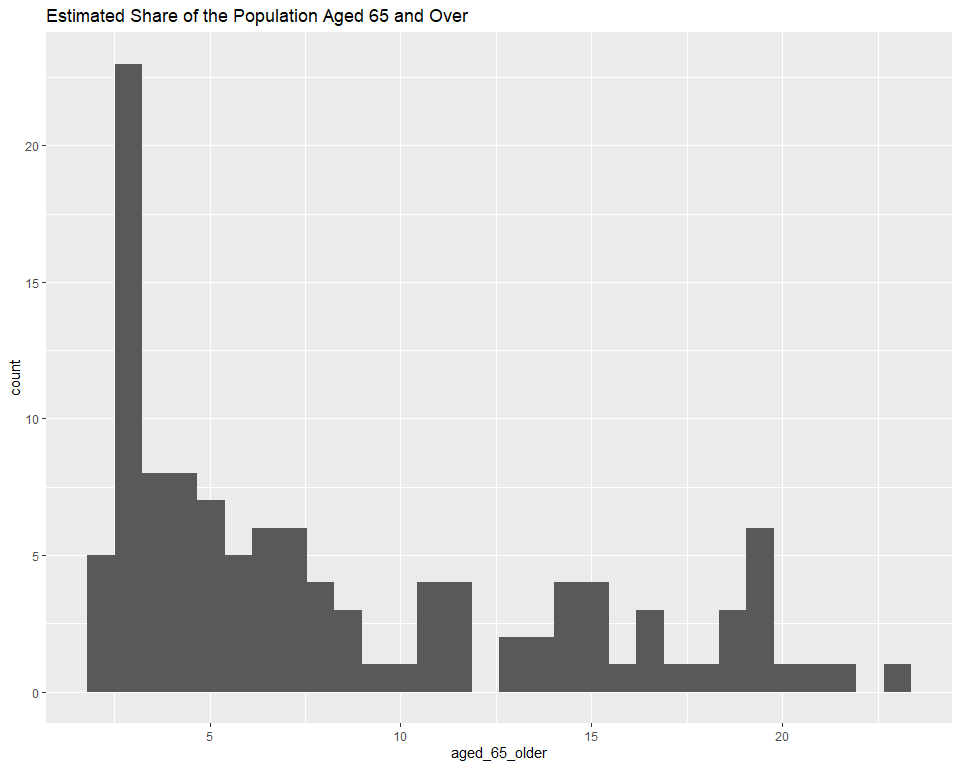


Figure 5.

#### Richer Countries do better than Poorer countries.

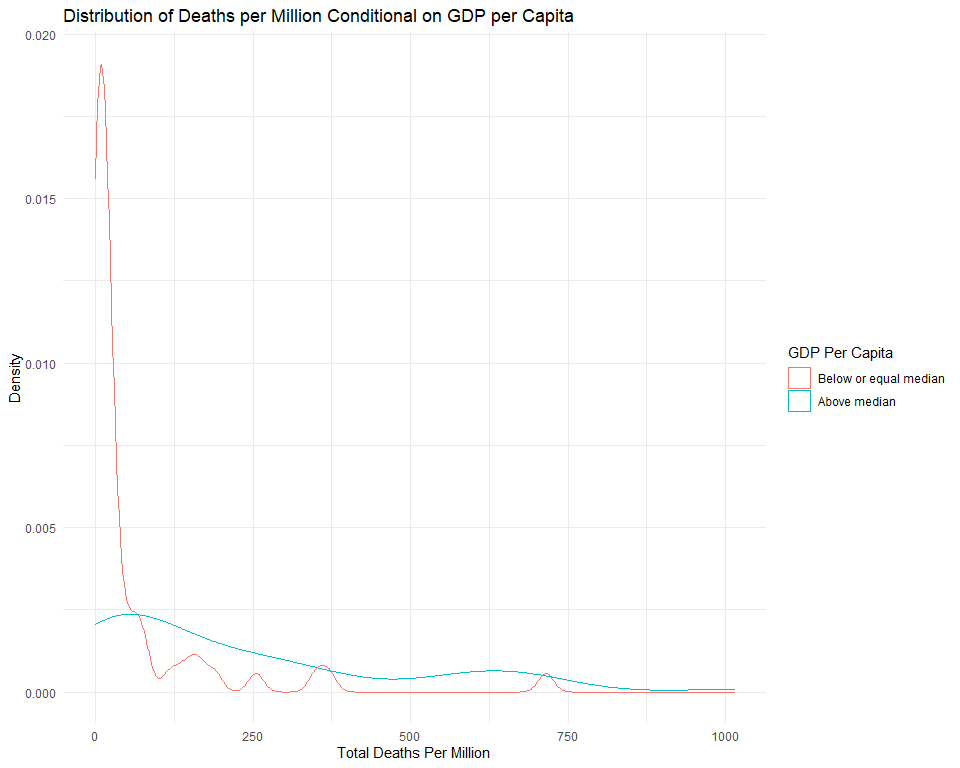


Figure 7.

#### Countries led by women are more successful than those led by men.

#### The success in dealing with the pandemic is related to the proportion of older people living in the country.

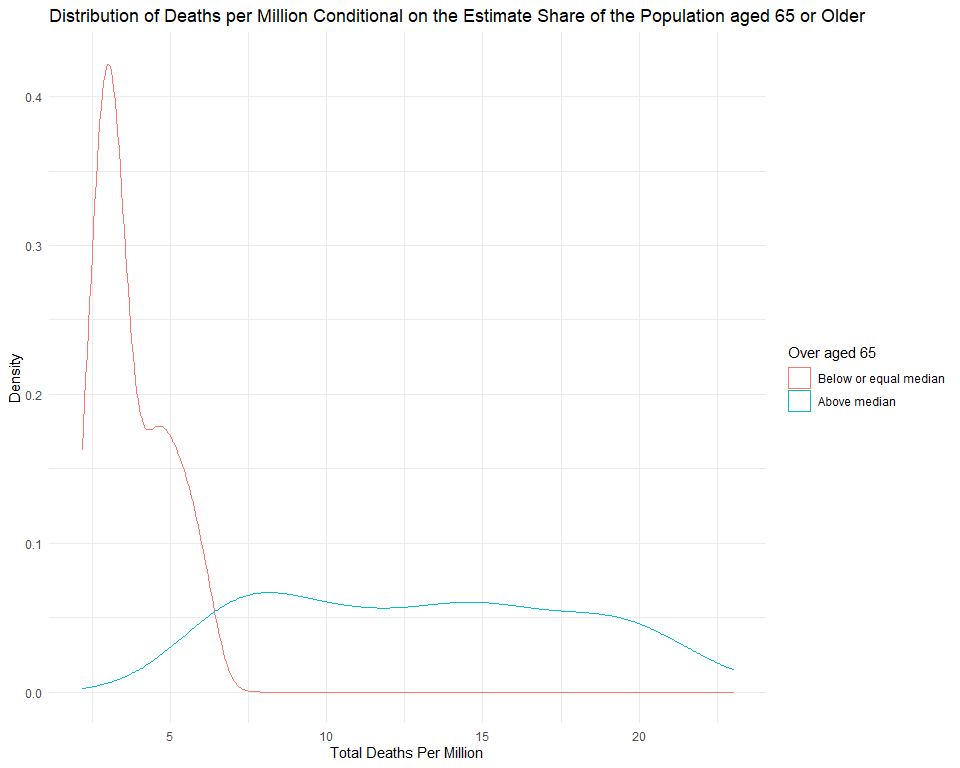


Figure 8.

#### Democratic countries are more successful than authoritarian countries.

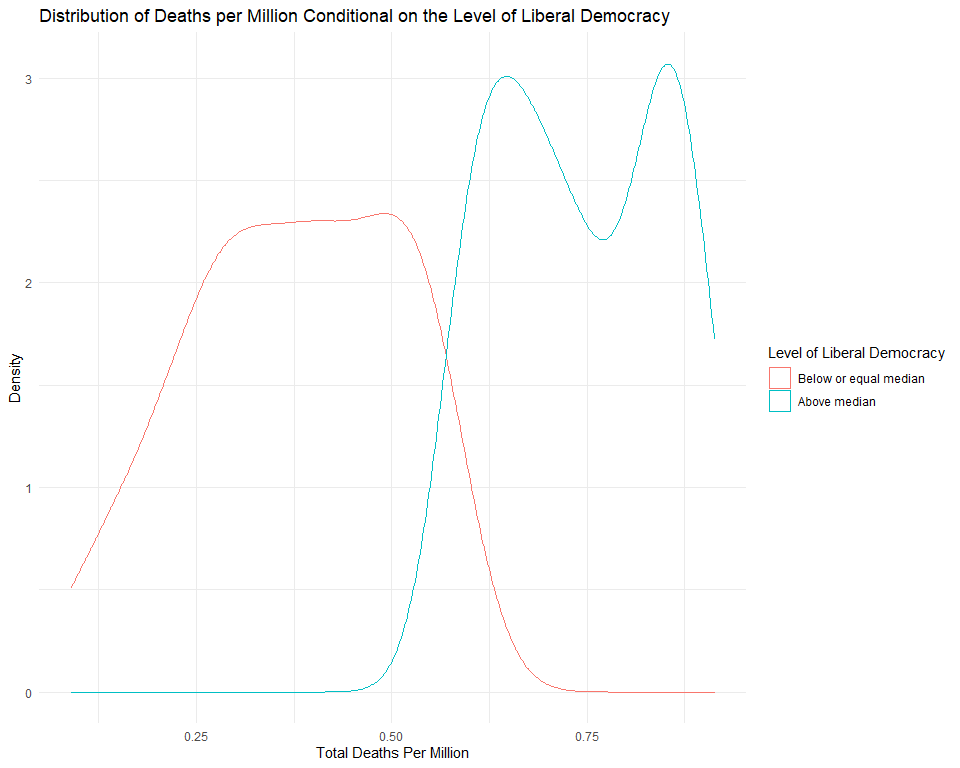


Figure 9.

## Conclusion:

## Code:

#### INSTALL LIBRARYS: ####  
library("ggplot2")  
library(tidyverse)  
library(tidyr)  
#### INPUT DATASET: ####  
dataset <- read.csv("https://raw.githubusercontent.com/QMUL-SPIR/Public\_files/master/datasets/Covid2020.csv")  
dataset\_omit <- read.csv("https://raw.githubusercontent.com/QMUL-SPIR/Public\_files/master/datasets/Covid2020.csv")  
dataset\_omit <- drop\_na(dataset\_omit, extreme\_poverty)  
head(dataset)  
  
#### EXAMINE THE RELEVENT VARIABLES: ####  
  
# Total Deaths Per Million:  
  
# MCT:  
   
tdm\_mean <- mean(dataset\_omit$total\_deaths\_per\_million)  
tdm\_mean  
  
# MD:  
  
sd(dataset\_omit$total\_deaths\_per\_million)  
  
# GDP Per Captia:  
# MCT:  
  
gdp\_per\_cap <- mean(dataset\_omit$gdp\_per\_capita)  
gdp\_per\_cap  
  
# MD:  
  
sd(dataset\_omit$gdp\_per\_capita)  
  
# Female Head of Government:   
  
# MCT:  
  
fem\_hog <- table(dataset\_omit$female\_HoG)  
fem\_hog  
  
# MD:  
  
fem\_hog\_dev <- prop.table(table(dataset\_omit$female\_HoG))  
fem\_hog\_dev  
  
# Aged 65 of Older:  
  
# MCT:  
  
old\_age <- mean(dataset\_omit$aged\_65\_older)  
old\_age  
  
# MD:  
  
sd(dataset\_omit$aged\_65\_older)  
  
# VDEM Polyarchy:  
  
# MCT:  
  
vdem <- mean(dataset\_omit$vdem\_polyarchy)  
vdem  
  
# MD:  
  
sd(dataset\_omit$vdem\_polyarchy)  
  
#### A TABLE WITH ALL THE VARIBALE AND MEASURE OF CENTRAL TENDENCY: ####  
  
# This will be added in Rmd  
  
#### A RELEVENT PLOT FOR EVERY VARIABLE ####  
  
# Total Deaths Per Million:  
gg\_total\_deaths\_per\_mil <- ggplot(dataset\_omit, aes(x = total\_deaths\_per\_million))  
gg\_total\_deaths\_per\_mil + geom\_histogram(binwidth = 10)  
  
# GDP Per Capita:  
gg\_gdp\_per\_cap <- ggplot(dataset\_omit, aes(x = gdp\_per\_capita))  
gg\_gdp\_per\_cap + geom\_histogram()  
  
# Female Head of Government:  
gg\_female\_HoG\_deaths <- ggplot(data = dataset\_omit, aes(x = female\_HoG)) +  
 geom\_histogram(binwidth = 20)  
  
geom\_text(size = 2,   
 colour = "red",   
 aes(label = location))  
  
gg\_female\_HoG\_deaths + facet\_wrap(~ female\_HoG)  
  
# Aged 65 or Older:  
gg\_aged\_65\_plus <- ggplot(data = dataset\_omit, aes(x = aged\_65\_older))  
gg\_aged\_65\_plus + geom\_histogram()  
  
# VDEM Polyarchy:  
gg\_vdem <- ggplot(data = dataset\_omit, aes(x = vdem\_polyarchy))  
gg\_vdem + geom\_histogram()  
  
#### RECODES FOR VARIBELS OF INTREST (BINARY)####  
  
# calculate median GDP Per Capita  
med\_gdp <- median(dataset\_omit$gdp\_per\_capita)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 gdp\_var = # name the new variable  
 factor(case\_when(  
 gdp\_per\_capita > med\_gdp ~ 1,  
 gdp\_per\_capita <= med\_gdp ~ 0)))  
  
# calculate median 65 or Older  
med\_65\_plus <- median(dataset\_omit$aged\_65\_older)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 sixty\_five\_var = # name the new variable  
 factor(case\_when(  
 aged\_65\_older > med\_65\_plus ~ 1,  
 aged\_65\_older <= med\_65\_plus ~ 0)))  
  
# calculate median vdem Polyarchy  
med\_vdem <- median(dataset\_omit$vdem\_polyarchy)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 vdem\_var = # name the new variable  
 factor(case\_when(  
 vdem\_polyarchy > med\_vdem ~ 1,  
 vdem\_polyarchy <= med\_vdem ~ 0)))  
  
  
  
#### RELATIONSHP BETWEEN TOTAL COVID 19 DEATHS AND THE RELEVENT VARIABLES ####  
  
 #### CONDITIONAL DISTRIBUTION PLOTS ####  
  
# Distribution of Deaths per Million Conditional on GDP per Capita  
  
gdp\_dist <- ggplot(data = dataset\_omit, aes(total\_deaths\_per\_million, group = gdp\_var)) +   
 geom\_density(aes(colour = gdp\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on GDP per Capita") + # title   
 scale\_color\_discrete(name = "GDP Per Capita", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
gdp\_dist  
  
# Distribution of Deaths per Million Conditional on median 65 or Older  
  
sixtyfive\_dist <- ggplot(data = dataset\_omit, aes(aged\_65\_older, group = sixty\_five\_var)) +   
 geom\_density(aes(colour = sixty\_five\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on the Estimate Share of the Population aged 65 or Older") + # title   
 scale\_color\_discrete(name = "Over aged 65", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
sixtyfive\_dist  
  
# Distribution of Deaths per Million Conditional on median vdem Polyarchy  
  
vdem\_dist <- ggplot(data = dataset\_omit, aes(vdem\_polyarchy, group = vdem\_var)) +   
 geom\_density(aes(colour = vdem\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on the Level of Liberal Democracy") + # title   
 scale\_color\_discrete(name = "Level of Liberal Democracy", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
vdem\_dist  
  
 #### TWO SAMPLE T-TESTS ####  
  
# T-Test: GDP  
  
t.test(vdem\_polyarchy ~ vdem\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval  
  
# T-Test: Aged 65 Plus  
  
t.test(aged\_65\_older ~ sixty\_five\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval  
  
# T-Test: VDEM Polyarchy  
  
t.test(vdem\_polyarchy ~ vdem\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval