Report: Catriona O'Leary

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Suicide in Young People

Introduction

This is a report analyzing data on deaths by suicide in young people aged 11-25 years old in Scotland. Suicide in Scotland makes up 25.7% of all deaths of people under the age of 25, which is staggeringly high compared to the 1.2% of deaths by suicide of people over 25. Those that did commit suicide between the years of 2011 - 2020 were found to be less likely to have had previous contact with mental health services when compared to the over 25 group. With new generations facing a world of economic crisis, social media, cost of living and the impact of the global pandemic it is more important than ever that we analysis these statistic and identify risk factors to decrease and prevent further suicides.

Report question

The question I will be examining and answering in my report is:

"Is suicide by young people on the rise in Scotland?"

Load packages

In order to be able to examine the data and produce a graph from it 'packages' must be loaded onto our R studio which give specific functionality. In this report I will be using the 'tidyverse' package.

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

Data acquisition

The data I will be using in this report is the "Deaths by suicide in young people, aged 11-25 years" sourced from Scotpho: https://scotland.shinyapps.io/ScotPHO_profiles_tool/

Read in data

Firstly the data is 'read in' as follows. The data I am using in this report contains a "period" column. This columns cells contain numbers that are a range of five years. To ease visual representation in my diagram I will be using the initial year the 'period' begins. Due to this code has been written to command only the 1-4 digits be used.

```
Suicide_data <- read.csv("~/Documents/Trends_ScotPHO_data_extract_2024-10-21.csv")

Suicide_data <- Suicide_data %>%
  mutate(year_start = substr(trend_axis, 1, 4))
```

Inspect Data

We use the glimpse function to initially inspect the data we have imported.

```
glimpse(Suicide_data)
```

```
## Rows: 17
## Columns: 12
## $ code                       <chr> "S00000001", "S00000001", "S00000001", "S000~
## $ areatype                   <chr> "Scotland", "Scotland", "Scotland", "Scotlan~
## $ areaname                   <chr> "Scotland", "Scotland", "Scotland", "Scotlan~
## $ indicator                  <chr> "Deaths from suicide in young people, aged 1~
## $ type_definition            <chr> "Crude rate per 100,000 population", "Crude ~
## $ definition_period          <chr> "2002 to 2006 calendar years; 5-year aggrega~
## $ trend_axis                 <chr> "2002-2006", "2003-2007", "2004-2008", "2005~
## $ numerator                  <dbl> 114.4, 112.6, 113.6, 113.8, 111.2, 116.2, 10~
## $ measure                    <dbl> 11.8, 11.5, 11.6, 11.6, 11.3, 11.7, 11.0, 10~
## $ upper_confidence_interval <dbl> 14.2, 13.9, 13.9, 13.9, 13.5, 14.1, 13.2, 12~
## $ lower_confidence_interval <dbl> 9.7, 9.5, 9.5, 9.5, 9.3, 9.7, 9.0, 8.4, 7.9,~
## $ year_start                 <chr> "2002", "2003", "2004", "2005", "2006", "200~
```

Data cleaning and preperation

Select trend_axis and measure

The data we are using in this report has 10 columns, we are most interested in two to make our graph from. Due to this we need to select and isolate the nesicary columns.

```
Deaths_from_suicide_in_young_people_aged_11_to_25_years <- Suicide_data %>%
  select(`trend_axis`,`measure`) %>%
  rename( `Frequency` = `trend_axis`,
          `Crude rate per 100000 population` = `measure`)
head(Deaths_from_suicide_in_young_people_aged_11_to_25_years)
```

```
##   Frequency Crude rate per 100000 population
## 1 2002-2006                              11.8
## 2 2003-2007                              11.5
## 3 2004-2008                              11.6
## 4 2005-2009                              11.6
## 5 2006-2010                              11.3
## 6 2007-2011                              11.7
```

Remove missing values

Missing values are then taken out from our data. In this data there have been no missing values or unique values.

```
Deaths_from_suicide_in_young_people_aged_11_to_25_years$`5-year period` %>% unique()
```

```
## NULL
```

```
Deaths_from_suicide_in_young_people_aged_11_to_25_years$`Crude rate per 100,000 population` %>% table()
```

```
## < table of extent 0 >
```

```
Deaths_from_suicide_in_young_people_aged_11_to_25_years %>% summary()
```

```
##   Frequency         Crude rate per 100000 population
##  Length:17          Min.   : 8.10
##  Class :character   1st Qu.: 9.70
##  Mode  :character   Median :10.90
##                     Mean   :10.46
##                     3rd Qu.:11.50
##                     Max.   :11.80
```

Check that data is tidy

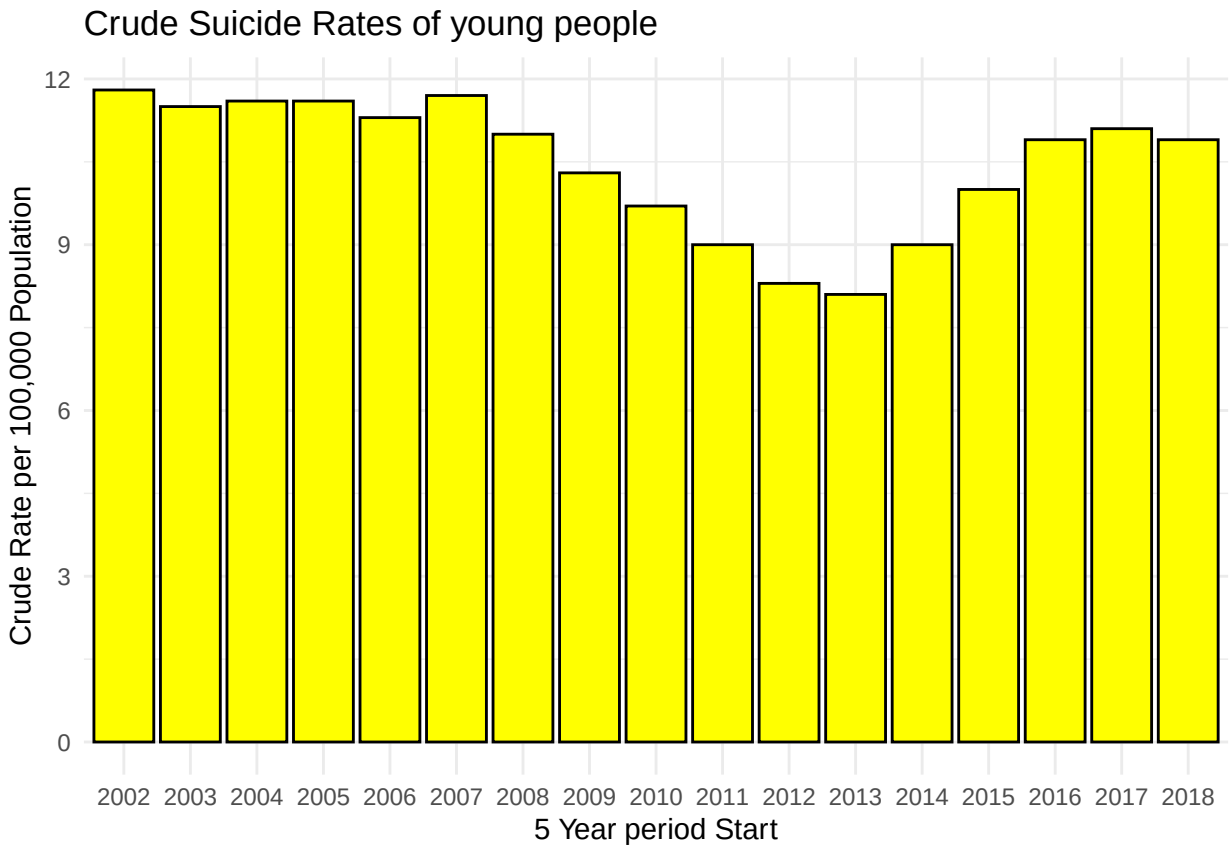
```
Suidicde_data <- Suicide_data %>%
  mutate(year_start = substr(trend_axis, 1, 4))
```

Data analysis and visualisation

Plot graph

The most efficient way to plot this graph is a bar chart, with colour to be more visually captivating, for this we use the ggplot and geom_col commands.

```
Suicide_data %>%
  ggplot(aes(x = year_start, y = measure)) +
  geom_col(fill = "yellow", colour = "black") +
  labs(
    title = "Crude Suicide Rates of young people",
    x = "5 Year period Start",
    y = "Crude Rate per 100,000 Population"
  ) +
  theme_minimal()
```

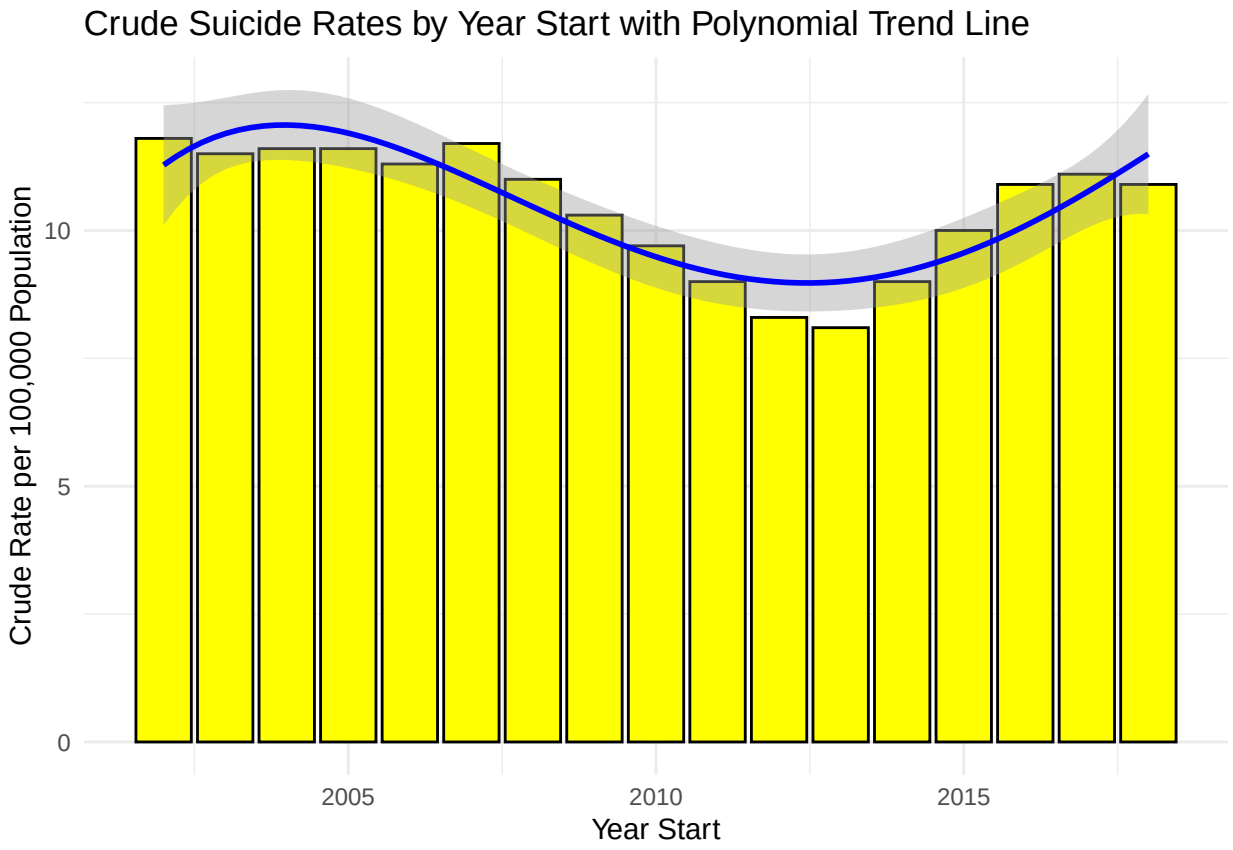


Graph with trend line

As the question of our report is; 'Is the rate of suicide in young people rising?' the most efficient way to visualise this in a graph is by adding a polynomial trend line. This way it is easy at first glance to appreciate the movement in values.

```
Suicide_data %>%
  ggplot(aes(x = as.numeric(year_start), y = measure)) +
  geom_col(fill = "yellow", colour = "black") +
  geom_smooth(method = "lm", formula = y ~ poly(x, 4), se = TRUE, colour = "blue", size = 1) +
  labs(
    title = "Crude Suicide Rates by Year Start with Polynomial Trend Line",
    x = "Year Start",
    y = "Crude Rate per 100,000 Population"
  ) +
  theme_minimal()
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```



Summary

In this report I have examined the rate of suicide by young people (aged 11-25) in the hope of providing insights into the rising number of suicides in Scotland. The target audience for this report includes members of the public as well as organisations whose main focus is on suicide prevention. The manner in which this has been visualised in the report aims to engage people in the topic and to clearly communicate the rise in suicides. With the overall intention of the report being to prompt people into preventative action.

The key question explored in this report is whether suicide rates are rising among young people in Scotland. The data analysis shows that after a continuous decrease in crude suicide rate between the starting years of 2002-2012, the suicide rate begins to steadily rise again (as seen in figure 2). These findings emphasize the need for more accessible mental health services, increased awareness and further investigation into factors which may be contributing to the increase.

The data analysis was conducted using data from ScotPho, from which two columns of information ('5 year period' as well as the 'crude rate per 100,000') were isolated to give us the data necessary to answer the question posed in the report. However, this is not without its limitations. Many of the '5 year periods' covered in the isolated column are overlapping in time, which may easily lead to repetitive figures being counted and thus giving incorrect insights. Along with this, there is no details regarding specific age, gender, or health board location. Furthermore, suicide remains an impermissible topic in many communities and religions leading to underreporting which may further affect the accuracy of data. Limitations on data sharing regarding the impact of factors such as socioeconomic conditions also limited the scope of interpretation.

Finally, the approach with the visualisation of data focuses on simplicity and clarity to ensure accessibility for a wider audience. The strengths of this approach include clarity and visually engaging graphs which effectively highlight the key message of the rise in suicides by young people in Scotland. However, the graph limits cross examination of causative issues as well as inability to further analyse the specific demographics of

the suicide data. Additionally, the static nature of the visualisations restricts the ability of users to interact with the data for further insights or specific values of each bar.