



Effect of Gender, Age Group and Human Development Index on Suicide Rate

Group 1:

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Background

- Suicide Rate and Gender
- Suicide Rate and Age Group
- Suicide Rate and HDI

Background

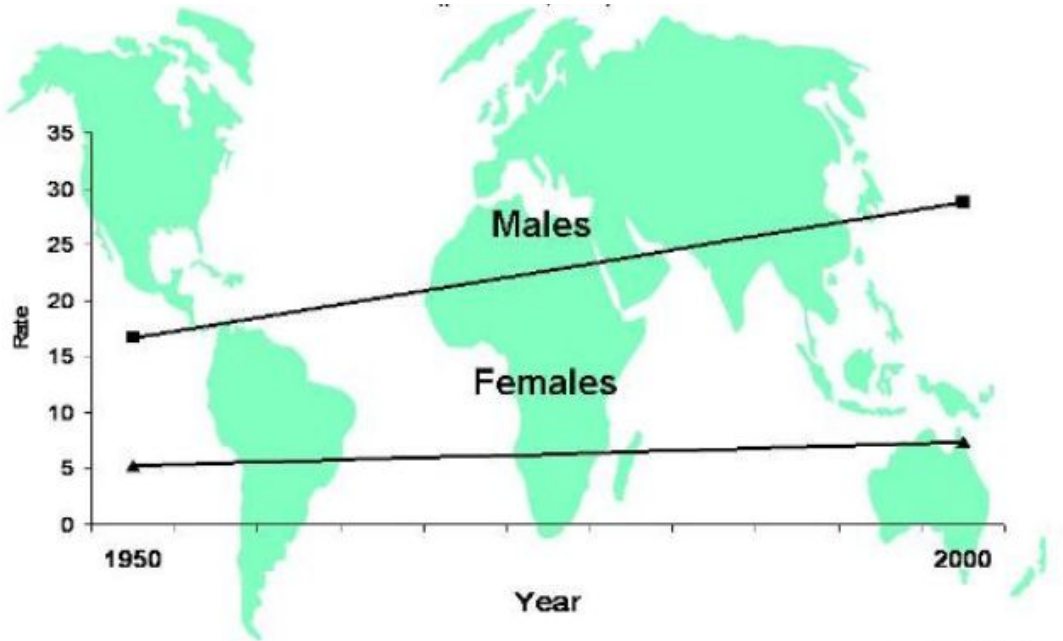


Death every 40 sec



- Close to 800 000 people die by suicide every year
- In the last 45 years suicide rates have increased by 60% worldwide.

Evolution of Global Suicide Rates 1950 – 2000 (per 100,000)



Background

- 15th leading cause of death in all ages
- Studies show: Highest suicide rate by age group are

05 – 14 } 05 – 24
15 – 24 }
25 – 34 → 25 – 34
35 – 54 → 35 – 54
55 – 74 } 55 +
75 + cc }

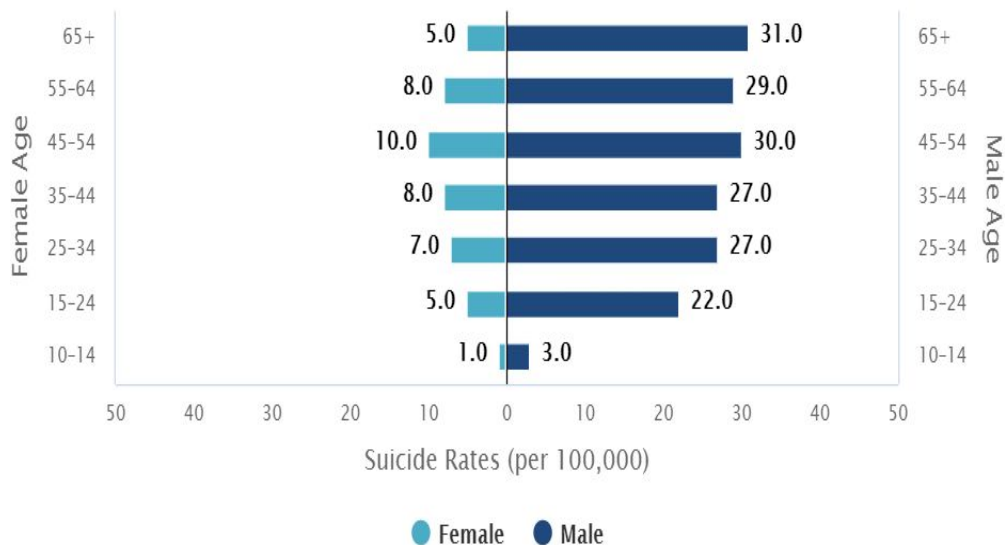


65 + years



45 – 54 years

Suicide rates by age (per 100,000)



Background

- Research points a linear correlation between HDI & suicide rate
- In 2016, WHO found high-income countries had the highest suicide rate.

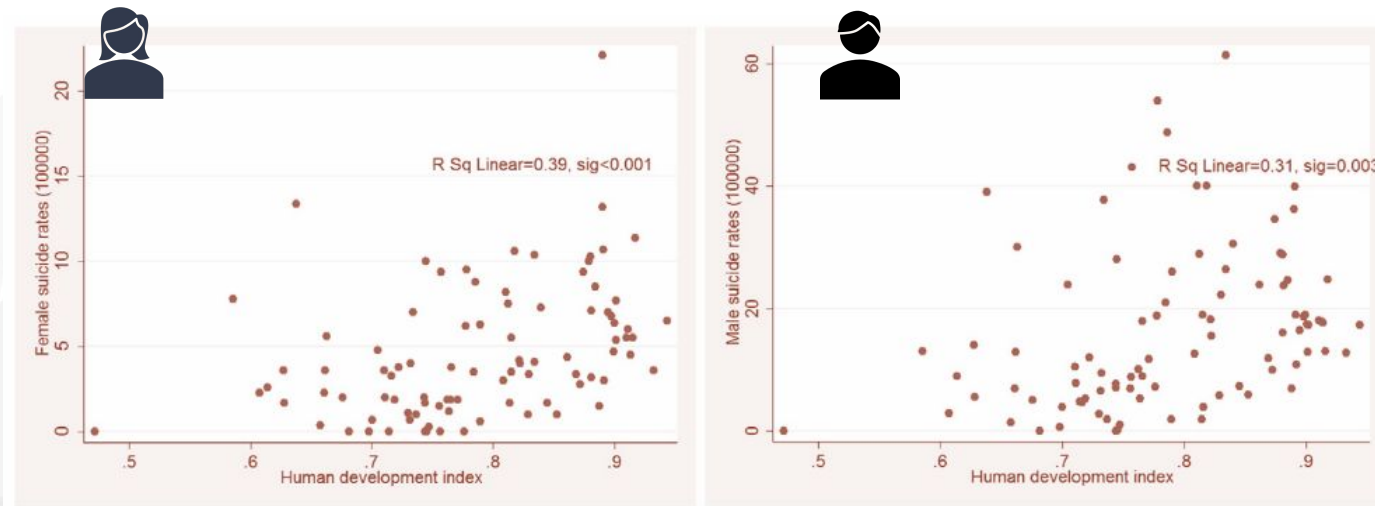
HDI

Life expectancy

Gross National
Income

Mean/Expected
years of schooling

Correlation between the Human Development Index





Objectives of the Study

1

Study the relationship between gender and suicide rate

2

Study the relationship between age groups and suicide rate

3

Examine the relationship between HDI and suicide rate



Hypothesis

- **H1:** *Men have a significantly different suicide rate than women*
- **H2:** *At least one of the age groups has a significantly different suicide rate*
- **H3:** *There is a positive correlation between HDI and suicide rate*



Methods


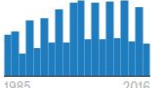

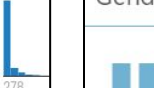
- Dataset
- Measurement
- Data Analysis



Dataset

- Suicide Rates Overview from 1985 to 2016 from Kaggle
- Dataset restricted from 2011-2015, 87 countries, and to the variables **Country**, **Gender**, **Age Group**, **Number of Suicides**, **Population** and **HDI** for the purpose of our study
- Calculated Variables:
 - *Average* Suicide Rate per 100k population (Average Number of Suicides*100000 / Average Population)
 - *Average* HDI over the timeline

Dataset

	country	# year	sex	age	# suicides_no	# popu
			male 50% female 50%	15-24 years 17% 35-54 years 17% Other (4) 67%		
1	Albania	1987	male	15-24 years	21	
2	Albania	1987	male	35-54 years	16	
3	Albania	1987	female	15-24 years	14	
4	Albania	1987	male	75+ years	1	
5	Albania	1987	male	25-34 years	9	
6	Albania	1987	female	75+ years	1	
7	Albania	1987	female	35-54 years	6	
8	Albania	1987	female	25-34 years	4	
9	Albania	1987	male	55-74 years	1	
10	Albania	1987	female	5-14 years	0	
11	Albania	1987	female	55-74 years	0	
12	Albania	1987	male	5-14 years	0	
13	Albania	1988	female	75+ years	2	
14	Albania	1988	male	15-24 years	17	
15	Albania	1988	male	75+ years	1	
16	Albania	1988	male	35-54 years	14	

Gender	Age_Group	Suicides	Population	Suicide_per_100k	HDI
female	25-34 years	538	3228492	3.33	0.82
female	35-54 years	840	5098078	3.3	0.82
female	5-24 years	1032	6897254	2.99	0.82
female	55+ years	681	4695699	2.9	0.82
male	25-34 years	2621	3273043	16.02	0.82
male	35-54 years	2939	4951495	11.87	0.82



Measurement

- **Dependent Variable:** Suicide Rate per 100K
- **Scale:** 0-81
- **Level of measurement:** Ratio



Measurement

<Independent Variables>

Variables	Description	Level of Measurements
Gender	Categories: Male / Female	Nominal
Age Group	5-24; 25-34; 35-54; 55+	Ordinal
HDI	Scale: 0.63 - 0.95	Ratio



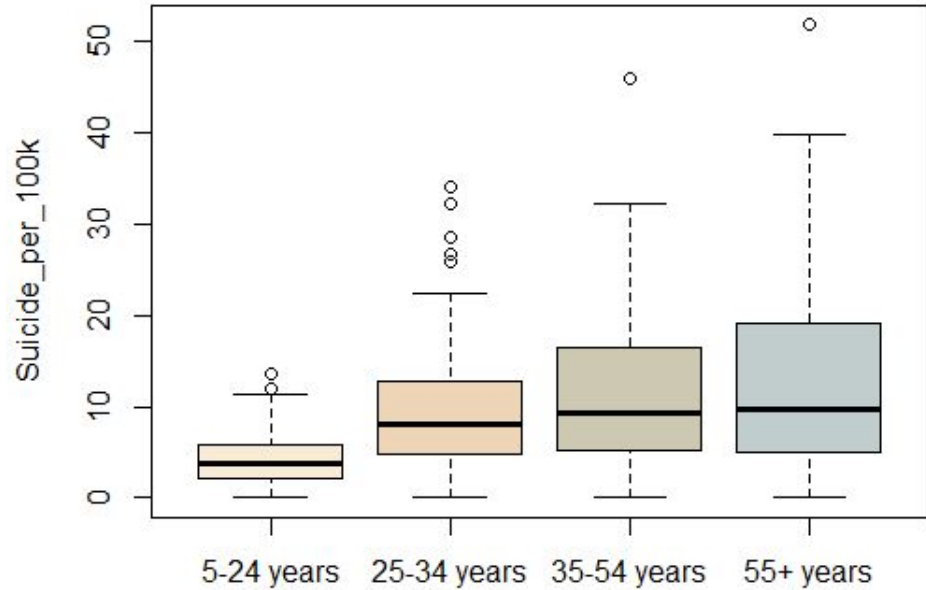
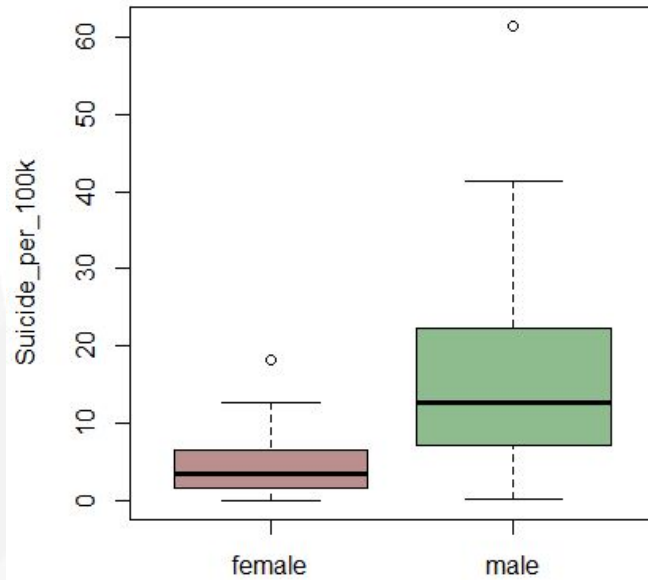
Data Analysis

Data Exploration: Box Plots; Descriptive Statistics
and Comparative Tests (T-test and ANOVA)

- General Population
- Male Population
- Female Population
- HDI

General Population

<Box Plots>



General Population

<Descriptive Statistics and Comparative Tests>

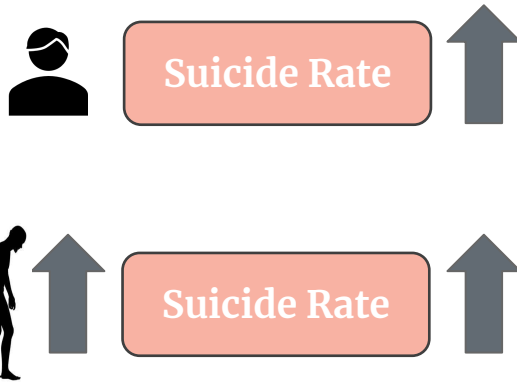


Table 1: General Population

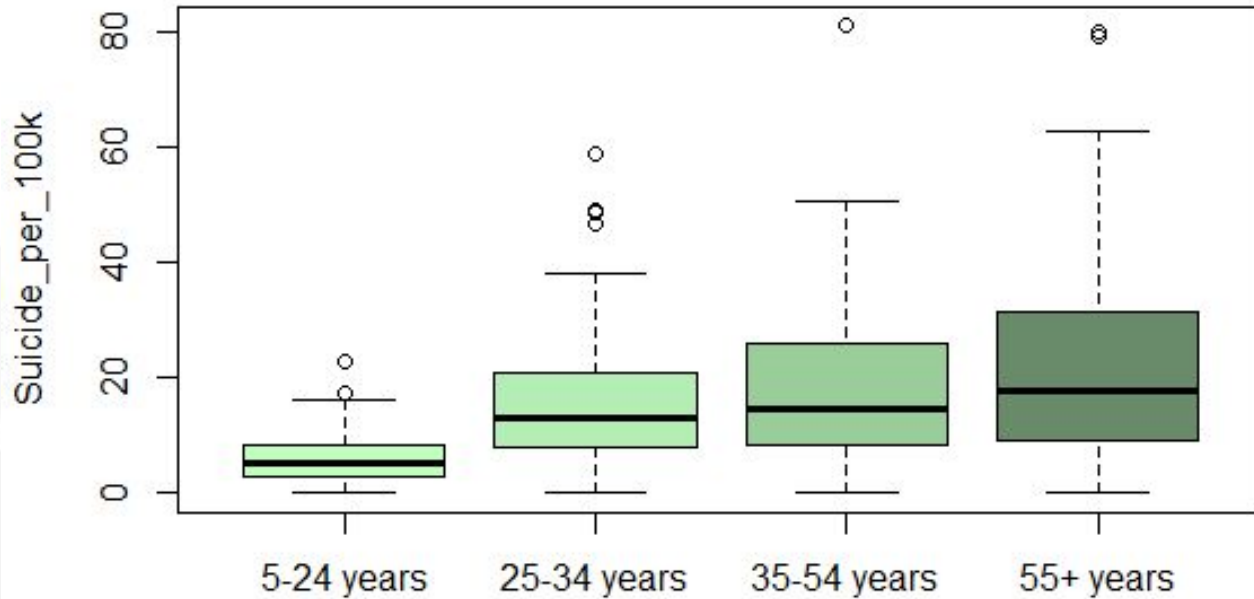
		N	Mean Suicide Rate per 100k (SD)
Gender	Male	87	15.439 (11.582)
	Female	87	4.236 (3.385)
		$t(101) = 8.659^{***}$	
Age Group	5-24 years	87	4.109 (2.846)
	25-34 years	87	9.499 (7.289)
	35-54 years	87	11.591 (8.715)
	55+ years	87	12.668 (10.229)
			$F(3, 344) = 20.85^{***}$
	Difference		
55+ years - 5-24 years		8.559 ^{***}	
55+ years - 25-34 years		3.169 [*]	
55+ years - 35-54 years		1.077	
35-54 years - 25-34 years		2.093	
35-54 years - 5-24 years		7.482 ^{***}	
25-34 years - 5-24 years		5.389 ^{***}	

Source: Kaggle

*** $p < .001$, ** $p < .01$, * $p < .05$.

Male Population

<Box Plots>



Male Population

<Descriptive Statistics and Comparative Tests>

- Highest Suicide Rate: 55+ years
- No significant difference between 55+ years and 34-54 years
- Significant difference between 55+ years and 5-24 years and 25-34 years

Table 2: Male Population

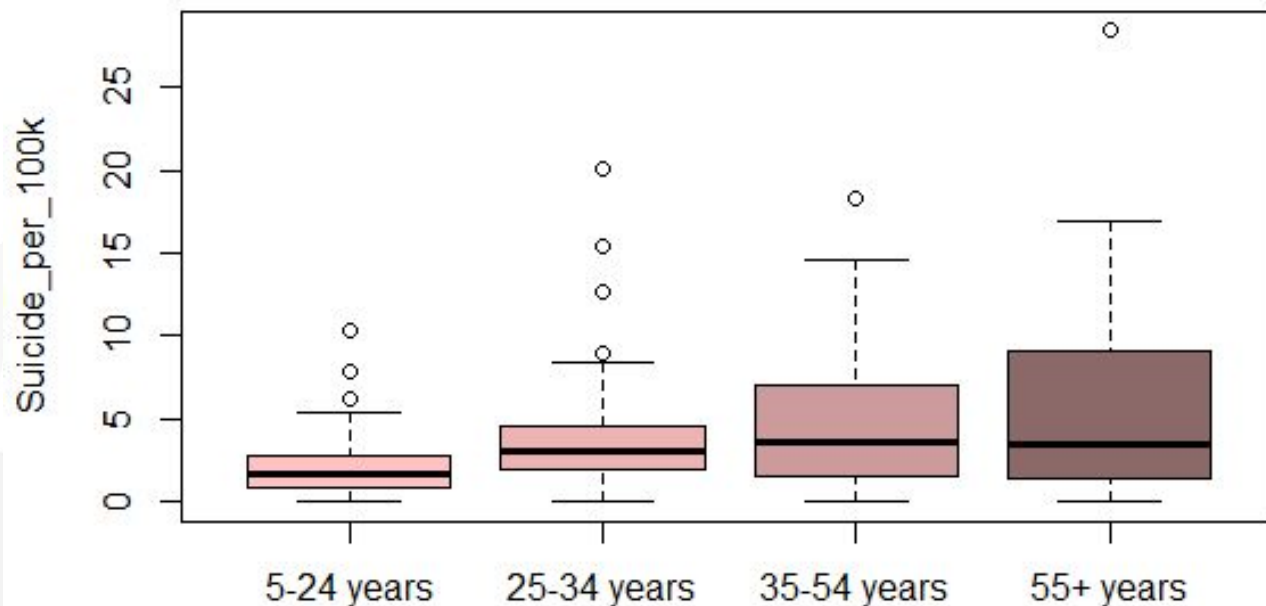
	N	Mean Suicide Rate per 100k (SD)
5-24 years	87	6.021 (4.266)
25-34 years	87	15.240 (11.943)
35-54 years	87	18.732 (14.336)
55+ years	87	21.905 (17.662)
F(3, 344)=24.18***		
Age Group	Difference	
55+ years - 5-24 years	8.559***	
55+ years - 25-34 years	6.665**	
55+ years - 35-54 years	3.172	
35-54 years - 25-34 years	3.493	
35-54 years - 5-24 years	12.712***	
25-34 years - 5-24 years	9.219***	

Source: Kaggle

***p<.001,**p<.01,*p<.05

Female Population

<Box Plots>



Female Population

<Descriptive Statistics and Comparative Tests>

- 35-54 years is not the age group with the highest suicide rate
- Highest suicide rate: 55+ years
- However, no significant difference between 55+ years and 35-54 years

Table 3: Female Population

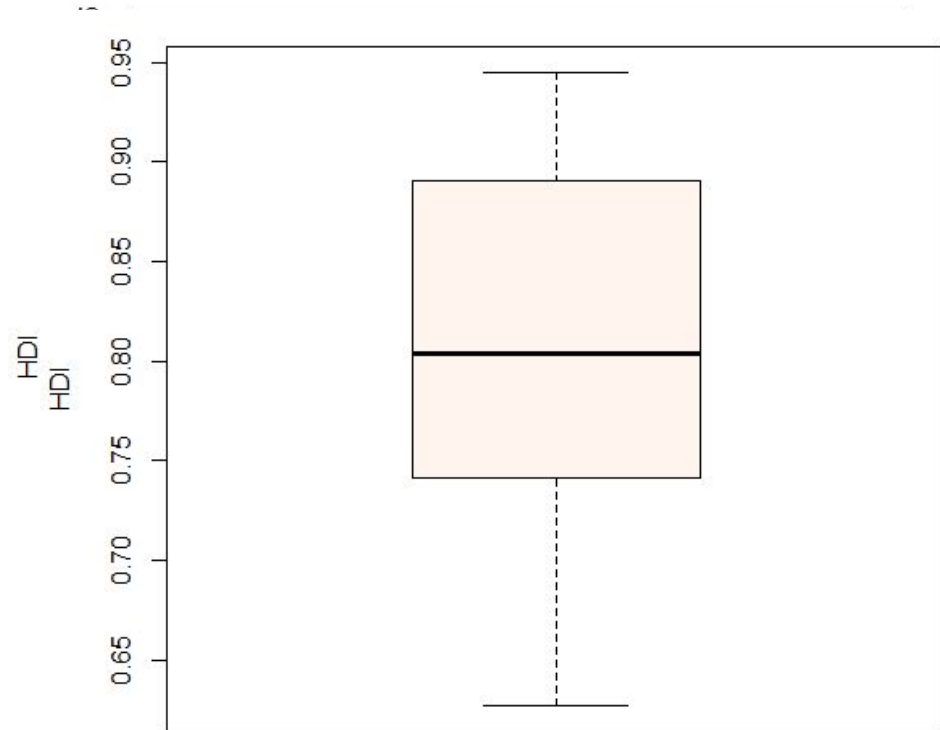
	N	Mean Suicide Rate per 100k (SD)
5-24 years	87	2.099 (1.789)
25-34 years	87	3.662 (3.217)
35-54 years	87	4.605 (3.787)
55+ years	87	5.462 (5.244)
F(3, 344)=12.95***		
Age Group	Difference	
	55+ years - 5-24 years	3.363***
	55+ years - 25-34 years	1.800**
	55+ years - 35-54 years	0.857
	35-54 years - 25-34 years	0.943
	35-54 years - 5-24 years	2.506***
	25-34 years - 5-24 years	1.563*

Source: Kaggle

***p<.001,**p<.01,*p<.05

Human Development Index

- Mean: 0.808
- SD: 0.0862
- Lowest HDI: Guatemala
- Highest HDI: Norway



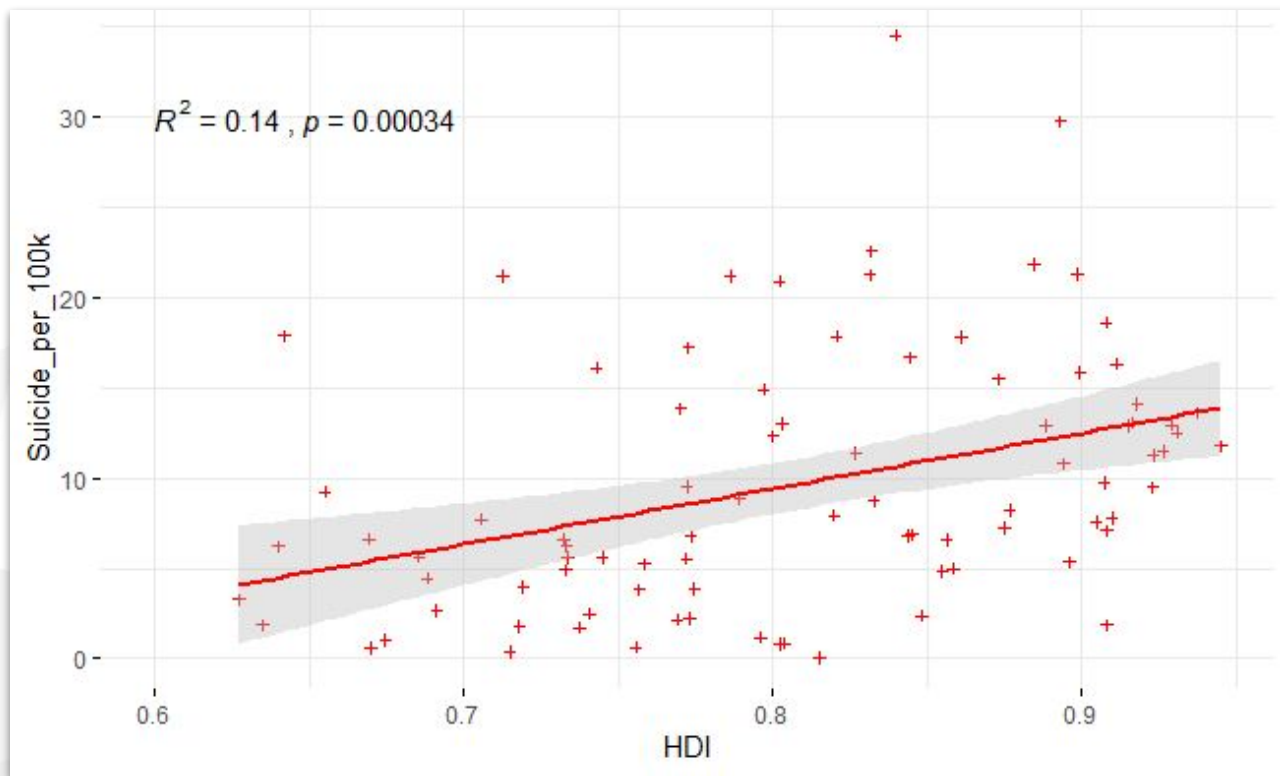


Linear Regression

- Regression Models
- Visualization

Visualization of Model 1

<HDI vs. Suicide Rate>



Regression Models

- Model 2: Male and 55+ years as reference groups
- Both models are statistically significant
- Gender and Age Group do a better job at explaining variance in suicide rate

Table 4: Regression predicting suicide rate per 100k population

Predictor	Model 1		Model 2	
	b	se	b	se
HDI	30.858***	8.263	-	-
Female	-	-	-11.518***	0.746
Age Group	-	-	-	-
5-24 years	-	-	-9.624***	1.056
24-34 years	-	-	-4.233***	1.056
35-54 years	-	-	-2.015	1.056
Intercept	-15.265*	6.715	19.442***	0.835
R-square	0.141***	-	0.3227***	-
N	87	-	696	-

Source: Kaggle

The coefficients are unweighted

*** $p < .001$, ** $p < .01$, * $p < .05$.



Conclusion

- Men have a higher suicide rate than women
- Age group with the highest suicide rate:
 - **Men:** 55+
 - **Women:** 55+
- Higher the HDI, higher the suicide rate - but HDI is not great at explaining variance in suicide rate



Thank you

Any Questions?





Reference

- Suicide Rates Overview 1985 to 2016: The dataset is produced by Kaggle and it consists of 12 variables as well as 27820 samples for 102 countries from 1985 to 2016. We are restricting the dataset to 2007-2016 and to the variables Country, Sex, Age and Suicides/100k pop.
<https://www.kaggle.com/russellyates88/suicide-rates-overview-1985-to-2016>
- Human Development Data <http://www.hdr.undp.org/en/data>
- Khazaei S, e. (2019). Suicide rate in relation to the Human Development Index and other health related factors: A global ecological study from 91 countries. - PubMed - NCBI. Retrieved 4 November 2019, from <https://www.ncbi.nlm.nih.gov/pubmed/28188120>