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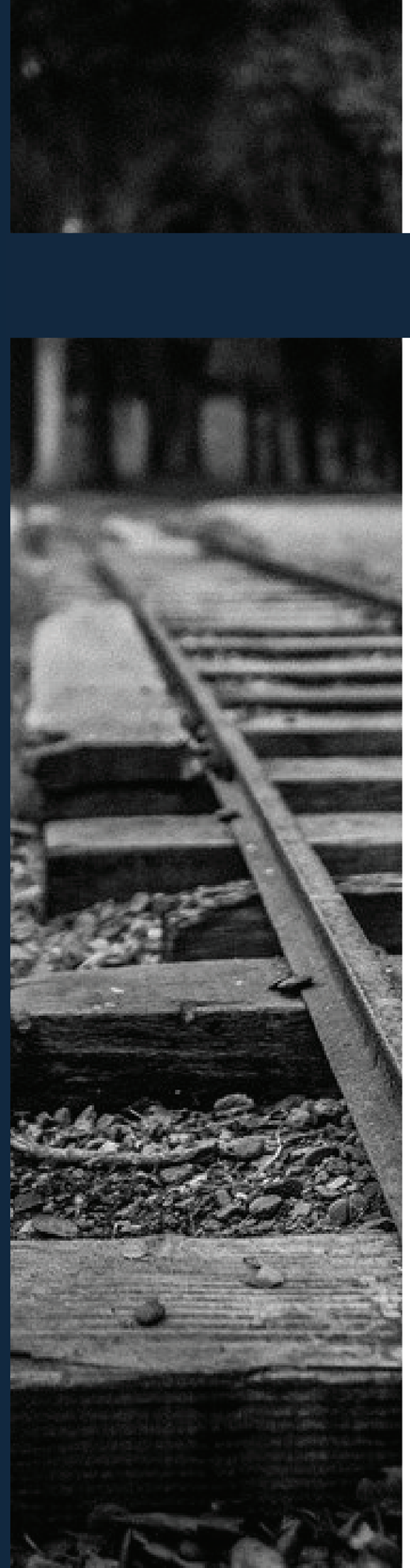
SUICIDE IN THE WORLD

REPORT BY RUIJUN LIU

Forewords

Suicides occur in all parts of the world world and across all demographics. Every 40 seconds a person dies by suicide, often preceded by many more attempted suicides. Nonetheless, suicides are not unpreventable. In order to compat suicide as a global public health problem, we must first understand its nature of occurance and prevalence. This report builds on the global knowledge base on suicide by analyzing existing data and literature on the epidemiology of suicides around the world. Furthermore, this report aims to not only provide descriptive statistics but also reak misconceptions, delve into the potential causes of suicide, and ultimately contribute to the existing literature on suicide prevention. Every single life lost to suicide is one too many--it's time to act.



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Global Distribution
Suicide Rates around the World

Data analysis reveals that suicide is prevalent across all cultures and demographics:

Suicide is the cause of death among people aged 15-24. **2nd** leading in the world

About suicide **800,000** people die from every year, averaging one death every 40 seconds.

The map below shows the average suicide rates (per 100,000 people) across the past 20 years for countries in the world. The darker the color, the higher the suicide rate. For example, Russia, which is highlighted in dark blue, has a suicide rate of over 35 incidences per 100,000 people, which is the highest in the world. Suicide rate goes as low as 0.93 in Antigua and Barbuda. Jamaica also has a remarkably low rate at 2.17. Both of these countries are highlighted in the lightest green.

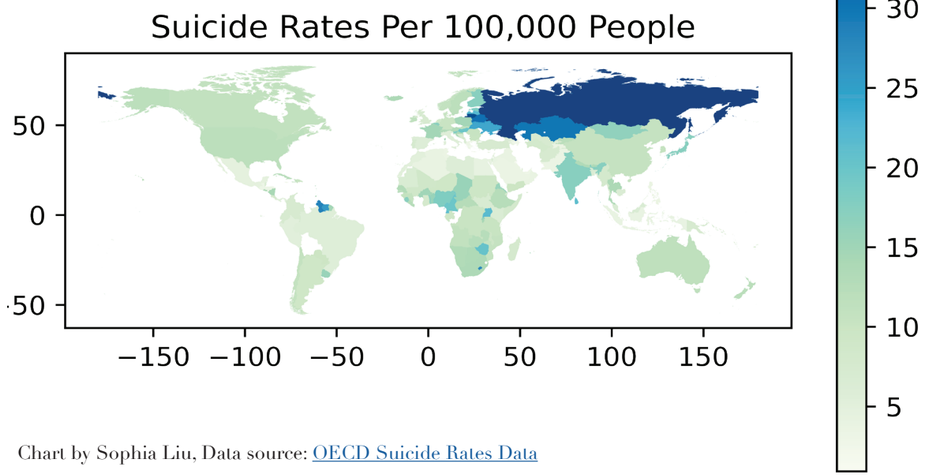


Chart by Sophia Liu, Data source: OECD Suicide Rates Data

Global Distribution
Suicide Rates around the World

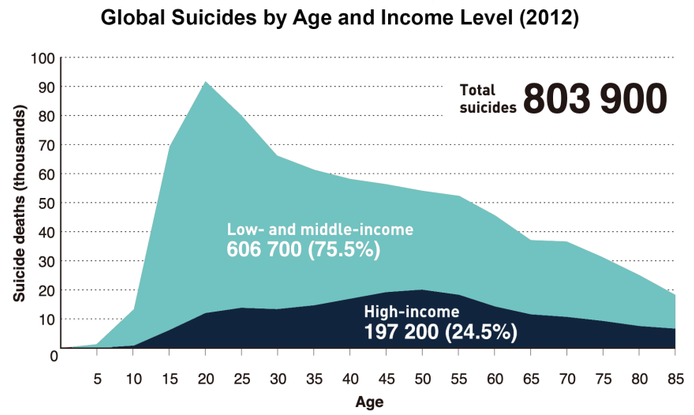


Chart by World Health Organization, Data source: Suicide Prevention Report

As shown by the graph on the left, countries classified as low or middle-income (light blue area) are more likely to have a higher suicide rate than high-income countries (dark blue area). In addition, the light blue area peaked at age 15-24, which means that this age group is most at risk in low/middle income countries. On the other hand, older age groups are more at risk in high-income countries, since the bulk of the dark blue area is in the 40-55 age range.

The graph on the right shows the top 6 countries that have the highest suicide rates, listed in the order of their rank from left to right. As aforementioned, Russia tops the chart with a suicide rate of 36.2 per 100,000. Some countries that follow are Lithuania, Belarus, Kazakhstan, Guyana, and Lesotho. Among these countries, there are countries like Lithania and Russia which are ranked as high-income countries, as well as Guyana and Lesotho which are ranked as some of the poorest countries in the world.

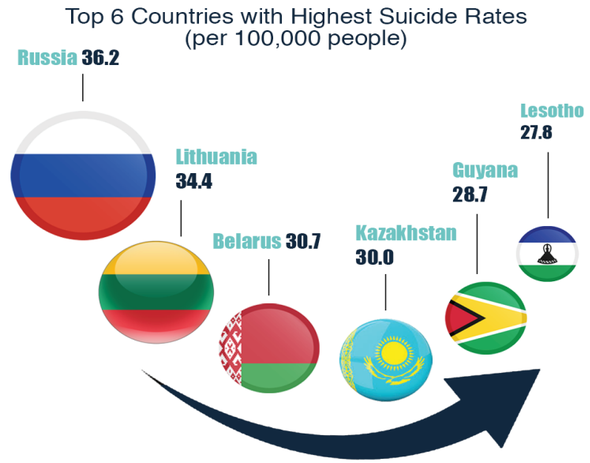


Chart by Sophia Liu, Data source: OECD Suicide Rates Data

Gender Disparities

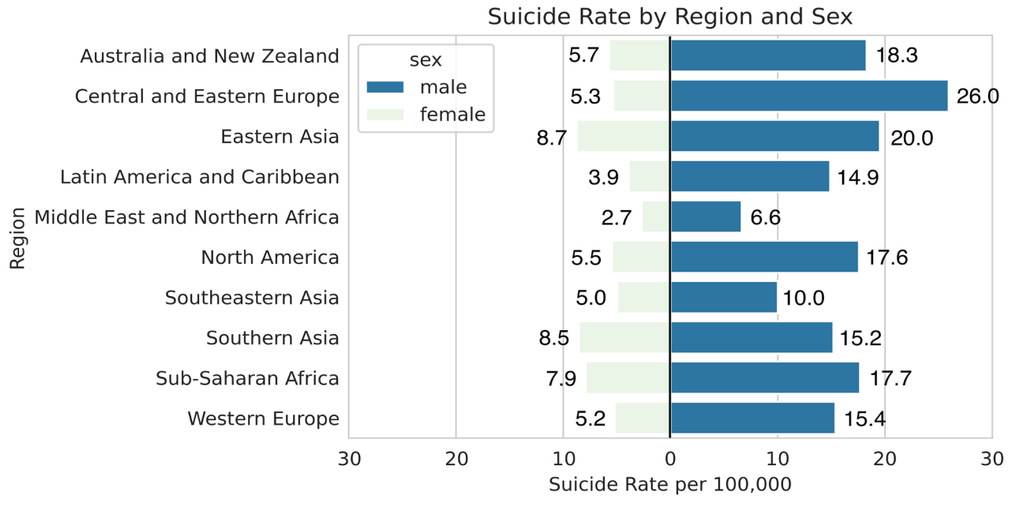


Chart by Sophia Liu, Data source: OECD Suicide Rates Data

When examining the prevalence of suicide it is crucial to consider whether females and males differ. In this case, it is apparent that there is such a systematic gender difference in which females have significantly lower suicide rates than males, across all geographic regions in the world. The graph above demonstrates the difference: the green bars on the left side of the graph represent the average suicide rates (per 100,000) among all females of a region, while the blue bars on the right side of the graph represent suicide rates among males. For all regions, the blue bars are longer than the green bars, which means that males have higher suicide rates than females. Moreover, suicide rates are at least 2X higher for males in all regions, and are 5X higher in regions like Central and Eastern Europe and Latin America and Caribbean. In fact, for all 183 countries examined, in only 8 countries do females have a higher suicide rate than males, and one such country is China. A two-sample t-test pulling data from all 183 countries further revealed that there is a significant difference between the suicide rates among females and males ($p<0.001$). This pattern is interesting, given that depression is much more prevalent among females than males. Depression as a predictor of suicide rate will be discussed in a following section

Change Over Time

Though suicide is still a major public health concern, there are some good news: in most regions suicide rates have fallen over the past 2 decades. The graph below shows how suicide rates changed over time. In this graph the y-axis is suicde rate per 100,000, x-axis is time, and the different colored lines are the trendlines, each representing a different continent. Among the five continents, Asia and Europe saw a drastic drop in suicide rate. Similarly, Latin America and Africa also saw a constant decrese. Australia and New Zealand also has a rate that's lower than that in 2000, though it is slightly higher than 2010's rate. The outlier here is North America, whose suicide rate rose continually over the past two decades. This may be suggesting that North American countires should further prioritize their suicide prevention efforts. Nonetheless, the big picture spells some optimism: 128 out of 183 countries have suicide rates that are lower than they were 2 decades ago. Even Russia, which still has the highest suicide rate, saw a drastic drop from 47.5 in 2000 to 34.5 in 2010 and 26.5 in 2016. For the few countries with the opposite trend the numbers did not go up by much (for example in the U.S. suicide rate went from 10.1 in 2000 to 13.7 in 2016), suggesting that suicide rates in those countries are relatively stable over time.

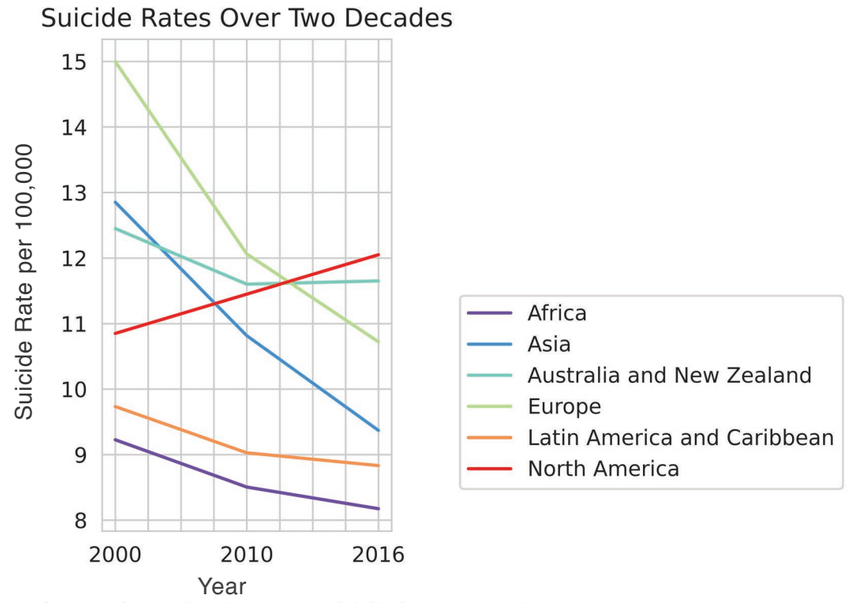


Chart by Sophia Liu, Data source: OECD Suicide Rates Data

Risk Factors

After examining the prevalence of suicide, it is time to take a step further and ask: why is suicide so prevalent? In orther words, what makes someone more likely to resort to suicide? This section examines some previously documented risk factors and evaluates their predictiveness. Specifically, it looks into depression, sunshine duration, and religion as predictors of suicide rate.

Depression

As A Risk Factor

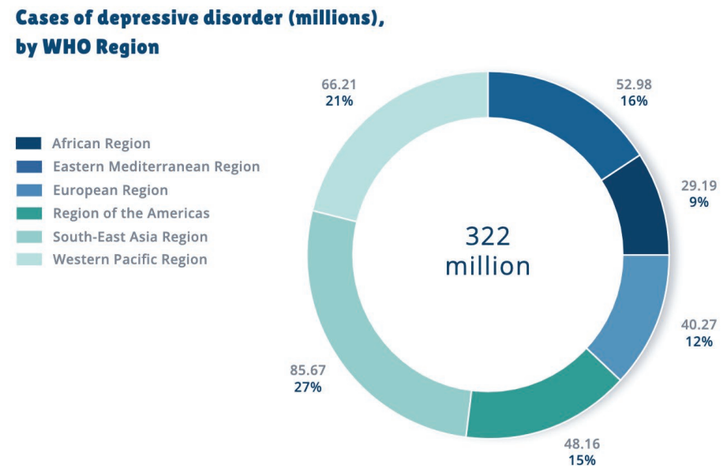


Chart by World Health Organization, WHO REFERENCE NUBER: WHO/MSD/MER/2017.2

The total number of people who live with depression is nearly 322 million, and this number increased by 18.4% in the last 2 decades. Incidences of depressiona are evenly spread out across regions. Depression and other mental health disorders are widely recognized as a major risk factor for suicide. Bertolote and Fleischmann (2002), for instance, reported that 98% of people who died from suicide would have had a diagnosable mental disorder.

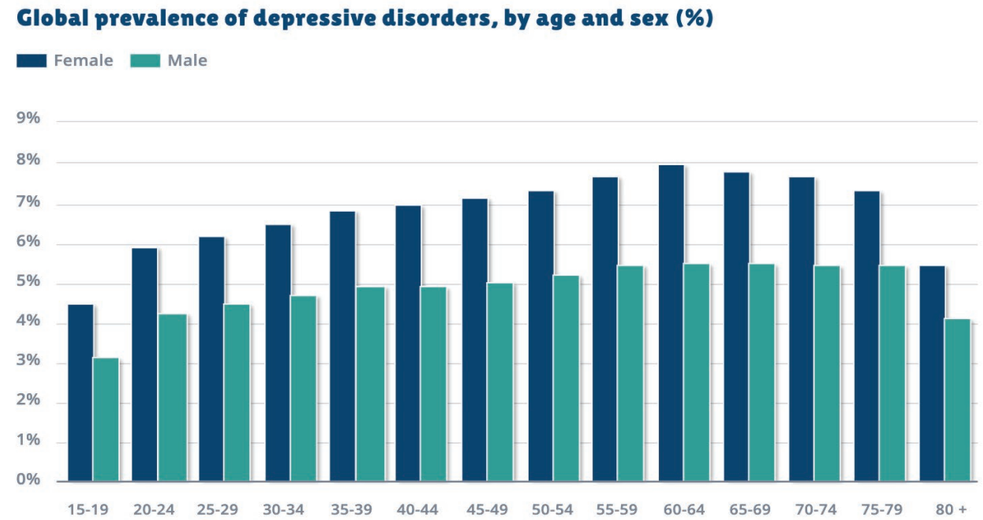


Chart by World Health Organization, Data Source: Global Burden of Disease Study 2015

Though Bertolote and Fleischmann claimed that there should be a high correlation between depression and suicide rate, there are some notable differences in the patterns of respective datasets. For one, females are more at risk of depression than males: as shown by the graph above, females (blue bars) have higher rates of depression than males (green bars) across all age groups. However, males have much higher suicide rates than females. One explanation for this discrepancy is that according to CDC, though females have more suicide attempts, their attempts often failed and are generally less successful than that of males'.

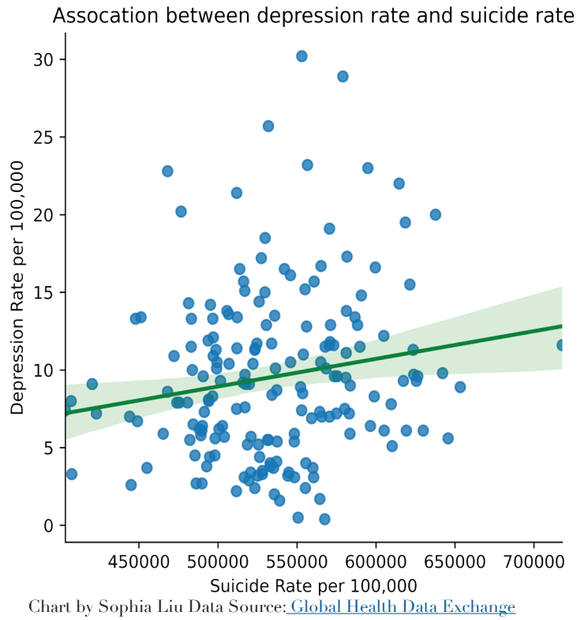


Chart by Sophia Liu Data Source: Global Health Data Exchange

Despite the discrepancy, depression rate was found to be significantly ($p<0.05$) correlated with suicide rate. The graph on the left shows this relationship: depression rate (per 100,000) is on the y-axis, while suicide rate (same unit) is on the x-axis. The blue dots represent values from 180 countries, while the green line demonstrate their relationship: there is a positive relationship between depression and suicide rates, which means that the higher the depression rate, the higher the suicide rate. Therefore, depression is likely a risk factor for suicide.

Sunshine Duration

As A Risk Factor

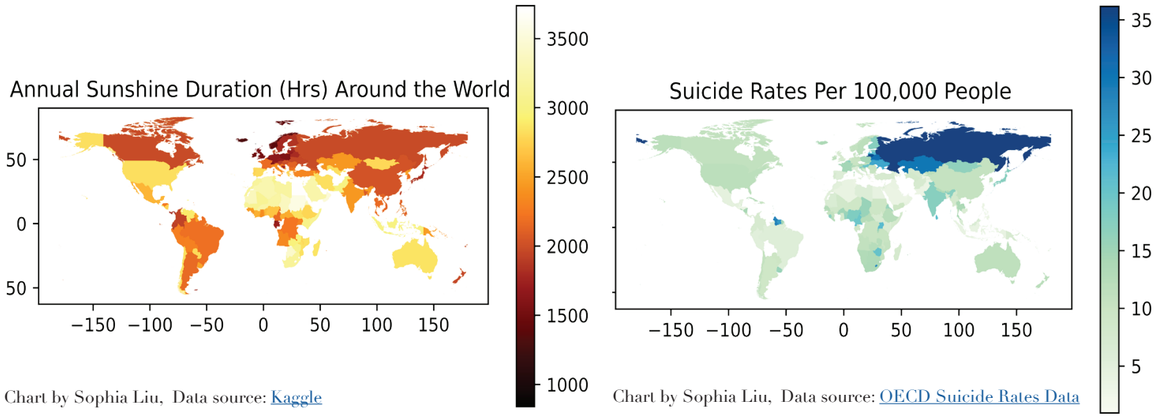
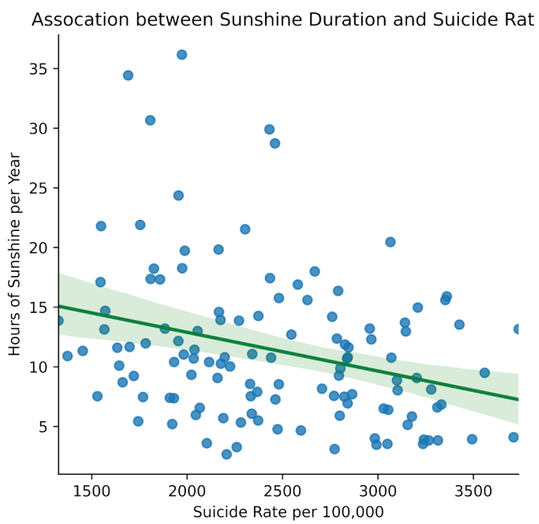


Chart by Sophia Liu, Data source: Kaggle

Chart by Sophia Liu, Data source: OECD Suicide Rates Data

Reduced levels of sunlight is known to affect serotonion, which is a neurotransmitter that has been linked to depression. Therefore, it is not surprising to see that sunshine duration is also correlated with suicide rate. The two graphs below compares sunshine duration by countries with suicide rates by countries. The graph on the left shows the hours of sunshine a country gets per year, where the ligher the color, the more hours of sunshine a country gets. The areas that get less sunlight actually match with the areas with high suicide rates, as shown on the right. For example, while Russia has a high suicide rate, it also has short sunshine duration. On the other hand, areas of Africa with rich sunlight also have low suicide rates.



The relationship between sunshine duration and suicide rate are clearly demonstrated in the graph on the left. There is a significant ($p<0.001$) negative relationship in which the more sunshine hours a country gets, the lower the suicide rate in that country. This is evidence that sunshine duration is a predictor of suicide rate. In light of this result, countries with shorter sunshine duration may need to be monitoring their suicide rates more closely. and implement prevention strategies accordingly.

Religion

This report also looked into religion, which is said to affect suicide rate. However, instead of being a risk factor, religion is said to counter suicidal thoughts. Different religions have different views on suicide, but most consider it to be a sin or a shameful act of cowardness. For example, in Catholism suicide is considered a mortal sin as one's life is the property of God. Similarly, Islam view suicide as sinful and detrimental to one's spiritual journey (Muslim Public Affairs Council).

A multiple regression model with suicide rates data and the proportion of people in 5 common religions (Christians, Jews, Muslims, Buddhists, Hindus) for 161 countries revealed that there is a negative relationship between suicide rates and religion: the higher the proportion of religious people, the lower the suicide rate. Though statistical significance was found for only 2 of the 5 religions (Christians and Muslims), all coefficients follow the same direction, which means that all religions exhibited a negative relationship with suicide rate.

Breaking Misconceptions

Variables that are said to affect suicide rate but failed to demonstrate a relationship

1. Money Can Buy Happiness?

Though it seems conceivable that countries with higher GDP will have lower suicide rates since those countries offer more economic and financial stability, regression analysis reveals that it is not the case. There is barely any relationship between a country's GDP and suicide rate, which may suggests that GDP is not representative of a country's citizens' life quality.

2. Longer Work Hours Leads to Suicide?

The pressure from work or overwork is said to be a risk factor for suicide. Nonetheless, a regression analysis failed to find a significant relationship between the annual total work hours and suicide rate in a country. However, this finding has limited implications since the sample size is small (n=34). Further research may look into hours overworked, rather than total hours worked.

3. Happiness Index?

Countries that scores higher in happiness presumably have lower suicide rates, since happy people are less likely to commit suicide. However, a regression analysis failed to find a significant relationship between happiness score and suicide rate. This may indicate that the happiness score is not an accurate representation of individual (cont.) happiness. It could also suggest that people at risk of suicide may not necesarrily see themselves as unhappy.

Key Messages

In conclusion, suicide as a global public health issue is prevalent across demographics and geographic regions. It is particularly prevalent among males and lower income countries. Though still a major concern, suicide rate has fallen in the past 2 decades all around the world. Some proven risks factors of suicide are depression, sunshine duration, and religion. Nonetheless, there are still many other yet-to-proven variables. Further resaerch should re-examine those variables and look for any interaction effect among them. The regional distribution of suicide also has implication for area-specific prevention strategies.

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