National Centre for Suicide Research and Prevention

Has the COVID-19 pandemic influenced Sweden's suicide rates during the year 2020?

Analysis of cause of death data

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Background

In the spring of 2021, NASP carried out routine statistical analyses of Sweden's suicide rates. These analyses aimed to identify the current suicide trends as well as deviations from previously identified suicide trends. Such changes are important to detect, so that new risk groups in the society can be identified quickly and the public health-oriented suicide preventive work can be guided more effectively. These analyses involved, for example, descriptive statistics of suicides in different age groups, stratified by gender, as well as by different self-harm related ICD codes (for example 'certain suicides' compared to 'uncertain suicides', or various suicide methods). The statistics were computed separately for Sweden and different Swedish regions.

Furthermore, NASP performed additional analyses of Sweden's suicide rates attributed to the COVID-19 pandemic. Previous research has shown that pandemics and other forms of societal crises are likely to influence suicide rates in the general population (NASP has published a brief summary of the current research on its home page: https://ki.se/en/nasp/the-coronavirus-risk-for-increased-suicide-and-self-harm-in-the-society-after-the-pandemic). According to previous research, there are indications that suicide rates in Sweden could decrease while the pandemic is ongoing (approximately from March 2020 onward), but that they will increase again after the pandemic is over. Alternatively, the suicide rates will return to normal after the temporary decrease. The additional analyses have therefore aimed to investigate whether suicide rates in 2020 have been abnormally low, alternatively abnormally high, compared to what would otherwise have been expected in a normal situation.

The National Board of Health and Welfare published a report Statistik om dödsorsaker år 2020 (2021-06-10), showing a decrease of suicides in 2020 ("Compared with 2019, there is an increase in fall accidents and a decrease in suicide for both women and men"; see page 4, and figure 6 on page 5). However, this data is inaccurate for several reasons. Firstly, the reduction referred to is only descriptive in nature and has not been confirmed by statistical hypothesis testing; Secondly, deaths by injuries with unknown intent ("uncertain suicides") are not taken into account; And thirdly, suicide rates are not presented by gender, age, or region. However, the National Board of Health and Welfare published a more complete overview of the cause of death data in Statistiskdatabasen för dödsorsaker (2021-06-23), which formed the basis for NASP's additional analyses presented below.

Method

A formal statistical analysis was performed to investigate whether the year 2020 was associated with a deviating suicide rate. The test used an alpha level of 0.05 and was two-sided, as the suicide rate during a given year can not only decrease, but possibly also increase. The primary test group was the entire Swedish population over the age of 15. Post hoc analyses were performed to assess whether the suicide rates have increased or decreased in a total of 30 demographic subgroups, defined on the basis of the variables gender (both genders, men, and women), age (15+ years, 15-24 years, 25-44 years, 45-64 years, and 65+ years) and region (Sweden and Stockholm County). The statistical methods included both a joinpoint regression and a linear regression, with the independent variable being the year and the dependent variable being the number of suicides (certain and uncertain) per 100 000 residents, which was referred to as 'suicide rate'. The analytical strategy consisted of first identifying the suicide trends that occurred between 1980 and 2019, and subsequently comparing the suicide rate for the year of 2020 with the suicide rate that would have been expected if those trends had continued. If the suicide rate for 2020 was significantly higher or lower than the statistically expected suicide rate, the hypothesis that 2020 was an "unusual year" would be supported, which could be due to the COVID-19 pandemic.

First, the demographic group was analyzed with an exploratory joinpoint regression, and included data for the entire period between 1980 and 2019. The purpose of this analysis was to determine if there was a statistically significant trend, i.e. a relationship between year and suicide rate. If the suicide trends were not significant, no further analyses were performed. Alternatively, if a significant suicide trend could be identified for a group, the starting year of that linear suicide trend, with 2019 as its final year, was noted. The effect size of the relationship between that starting year and its suicide rate was calculated as the annual percentage change. Then, a simple linear regression line between the significant suicide trend's starting year and the suicide rate was calculated, which only consisted of the data points that were part of that linear suicide trend. Using this regression model, the predicted suicide rate for the year 2020 was calculated, including the suicide rate's 95% confidence interval. Finally, the observed suicide rate for the year 2020 was compared with the predicted value for 2020, and was considered to be significantly different if it fell outside the predicted confidence interval.

Results

Within Sweden's population, consisting of the demographic group of both genders of 15 years and older, there is a significant downward suicide trend from the year 2000 (95% CI = 1997 – 2004) until the end of 2019 (annual percentage change = -0.4%; 95% CI = -0,7% – -0.1%; $p<0.05$). The regression analysis for this period shows that the predicted suicide rate for the year of 2020 was 18.49 suicides per 100 000 residents (95% CI = 16.73 – 20.24). The observed value was 16.80, which is significantly smaller than the predicted value (18.49), but still within the statistical margin of error.

The results for the demographic subgroups are not reported in detail in this document, but none of the 30 groups had an observed suicide rate in 2020 that fell outside the predicted value's 95% confidence interval. In other words, no significant deviations were observed in 2020.

Conclusion

The results of the analyses indicate that even though the decline of suicide rates in 2020 was approximately twice as large as had been expected from the generally declining trend since the year 2000, this reduction is within the statistical margin of error. Whether the pandemic will continue to affect suicide rates of Sweden's population is unclear, but as pointed out above, previous research on similar situations indicates that the suicide rates may increase after the end of the pandemic. Therefore, strengthened preparedness for a potential increase in suicides in the future is recommended, especially through the implementation of evidence-based suicide prevention measures (see: Rekommendationer för suicidpreventiva insatser).