BJPsych | The British Journal of Psychiatry (2022) 220, 38–40. doi: 10.1192/bjp.2021.136

Short Report

Suicides from 2016 to 2020 in Finland and the effect of the COVID-19 pandemic

Timo Partonen, Olli Kiviruusu, Marjut Grainger, Jaana Suvisaari, Aki Eklin, Antti Virtanen and Riitta Kauppila

The COVID-19 pandemic has had negative mental health outcomes in populations, but the suicide numbers in Finland have remained unchanged compared with expected levels based on the pre-pandemic period. We included all deaths from suicide verified by the official cause-of-death investigations, including forensic autopsy with analysis of forensic toxicology samples, between 1 January 2016 and 31 December 2020 in Finland. There was a decline in suicide incidence from 2016 to 2020 in men, and a declining tendency in suicide rates for every consecutive month during the COVID-19 pandemic period. The COVID-19 governmental policy responses do not seem to have led to an increase in suicide numbers.

Keywords

Suicide; population; forensic medicine; autopsy; mortality.

The ongoing COVID-19 pandemic is associated with increased levels of psychological distress, which meets the threshold for clinical relevance and might be of public health concern.[1] At its most extreme, this impact seems to manifest as increases in suicidal ideation, especially among younger people and women.[2] Suicidal ideation may turn into death from suicide, but national data derived from four European countries (Croatia, Estonia, the Netherlands and Poland) found that in the early months of the pandemic, suicide numbers declined (Estonia, Poland) or increased (Croatia, the Netherlands), but these changes were not statistically significant when compared with expected levels based on the pre-pandemic period.[3]

The aim of our analysis was to examine, by using the most recent data available from 1 January 2016 up to 31 December 2020, whether the impact of the COVID-19 pandemic was associated with changes in suicide numbers in Finland. In addition, we modelled whether the time since the onset of the COVID-19 pandemic was associated with variation in the monthly suicide numbers.

Method

The data comprised all deaths from suicide (ICD-10 codes: X60–X84, Y870), verified by the official cause-of-death investigations, including forensic autopsy with analysis of forensic toxicology samples, between 1 January 2016 and 31 December 2020 in Finland. The data were obtained from the Forensic Medicine Unit of the Finnish Institute for Health and Welfare, the legal authority in charge of forensic medicine guiding and monitoring the cause of death investigations in Finland. The date of death and gender of the deceased were included in the data. According to the official census by Statistics Finland, the number of people living in Finland remained largely constant from 2016 to 2020, increasing by 0.32% (from 2 790 970 to 2 799 985) for women and by 0.79% (from 2 712 327 to 2 733 808) for men.

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation, as well as with the Declaration of Helsinki as adopted by the World Medical Association in 1964 and amended thereafter. All procedures involving human participants were approved (Dnro THL/2010/6.02.00/2018) by the institutional review board (IRB 00007085) of the Finnish Institute for Health and Welfare (FWA 00014588) on 9 October 2018.

We used Poisson regression to analyse time variation in the monthly suicide incidence rates during the study period and the COVID-19 pandemic period. In the Poisson models, the year was included as a continuous variable. Seasonal variation in the occurrence of suicide (see Partonen et al[4]) was modelled with the sine and cosine functions included in the regression,[5] using the following terms: $\sin(2\pi t/12)$ and $\cos(2\pi t/12)$, where $t = 1$ for January, $t = 2$ for February, etc. The COVID-19 pandemic period was coded as 1 for each month from (and including) March 2020 onward, and otherwise as 0. Time elapsed since the onset of the COVID-19 pandemic (in months) was coded as April 2020 = 1, May 2020 = 2, December 2020 = 9 etc, and otherwise as 0. The first Poisson model included the year, the sine and cosine seasonal terms and the COVID-19 pandemic period. The second Poisson model also included the time elapsed since the onset of the COVID-19 pandemic. Results were presented as the incidence rate ratios (IRRs) and their 95% confidence intervals. Separate analyses were conducted for men and women. Analyses were calculated with IBM SPSS Statistics for Windows, version 27.

Results

The number of suicides in Finland from 2016 to 2020 is presented in Fig. 1, and by age group in Supplementary Table 1 available at https://doi.org/10.1192/bjp.2021.136.

In men, the first regression model showed a decline in suicide incidence from 2016 to 2020, with an IRR of 0.96 for the year (95% CI 0.93–0.99, $P = 0.023$; see Supplementary Table 2). Of the two seasonal effects, the term based on the cosine function was significant (IRR = 0.93, 95% CI 0.88–0.97, $P = 0.003$), whereas the term based on the sine function was not (IRR = 1.00, 95% CI 0.95–1.05, $P = 0.961$). For the COVID-19 pandemic period, no significant change in suicide incidence was indicated (IRR = 0.96, 95% CI 0.84–1.10, $P = 0.560$). In the second Poisson model, where time elapsed since the onset of the COVID-19 pandemic was added, the IRR for the COVID-19 pandemic period remained non-significant (IRR = 1.11, 95% CI 0.91–1.36, $P = 0.303$). The IRR for time elapsed since the onset of the COVID-19 pandemic (IRR = 0.97, 95% CI 0.93–1.00, $P = 0.068$) showed a declining, yet non-significant, tendency in suicide incidence for every consecutive month

https://doi.org/10.1192/bjp.2021.136 Published online by Cambridge University Press

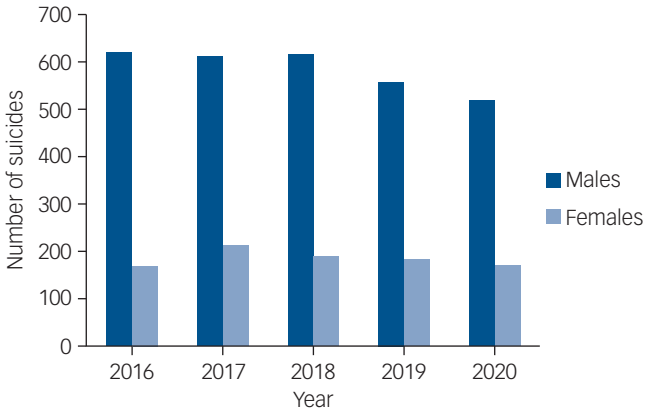

Fig. 1 Number of suicides in Finland from 2016 to 2020.

during the COVID-19 pandemic period (see also Supplementary Fig. 1).

In women, the first Poisson regression model indicated that there were no significant changes in suicide incidence according to the year (IRR = 1.01, 95% CI 0.96–1.07, $P = 0.678$), the seasonal effects along the sine (IRR = 0.95, 95% CI 0.87–1.05, $P = 0.316$) or cosine (IRR = 0.95, 95% CI 0.87–1.05, $P = 0.315$) function, or the COVID-19 pandemic period (IRR = 0.85, 95% CI 0.68–1.07, $P = 0.164$). Time elapsed since the onset of the COVID-19 pandemic, when added to the model 2, was not significant either (IRR = 0.97, 95% CI 0.91–1.03, $P = 0.314$).

Discussion

We found that there was a decline in suicide incidence from 2016 to 2020 in men, as well as a declining tendency in suicide rates for every consecutive month during the COVID-19 pandemic period in Finland. This is the first report on decreasing nationwide suicide numbers during the COVID-19 pandemic until December 2020. However, the pandemic is ongoing, and a decreasing suicide incidence was recorded from 2016 to 2020, so the decline had already started before the onset of the COVID-19 pandemic and subsequent governmental policy responses. In women, there was no significant change in suicide incidence, nor was there any effect related to the COVID-19 pandemic period.

This is not unexpected as suicide mortality has been decreasing in Finland since 1990.[6] Well-developed community mental healthcare and the prominence of out-patient services have been associated with relatively low suicide rates within Finland,[7] where the national suicide mortality is still higher than the average in the EU but there is a national suicide prevention programme currently in effect. Furthermore, clinically meaningful symptoms of depression were seen less frequently in countries where governments implemented stringent COVID-19 policies promptly,[8] to which Finland appears to belong,[9] with inhabitants who have a high degree of adherence with the restrictive measures as well as confidence in their government, medical authorities and healthcare organisation.[10]

During the early months of the COVID-19 pandemic, suicide rates were declining in many countries,[3] which contradicts earlier data from countries around the world during economic recession,[11] under which increases in suicide rates, particularly those in men of working age, have been recorded. There is no explanation for this inconsistency, but it remains to be seen whether a negative influence on suicide rates evolves while the pandemic prolongs.

In a previous study in which national European data were analysed,[3] the COVID-19 pandemic period was defined as starting from 1 April 2019, and the data were available for three countries (Croatia, Estonia and the Netherlands) from January 2016, and for two countries (Croatia and Poland) until October 2020. Thus, of the four countries, Croatia provided data that had the most similar coverage to ours. Our data of January 2016 to December 2020 extends the view beyond the earlier study findings. However, it is of note that by our definition, the COVID-19 pandemic period started in Finland from March 2020, since here the first verified SARS-CoV-2 case was publicised in the media on 29 January 2020, the first hospital admission owing to COVID-19 was reported on 27 February 2020, the first governmental recommendations were issued on 8 March 2020 and the first governmental restriction measures were implemented on 11 March 2020. In the previous study,[3] the primary (April to July 2020), first sensitivity (April to October 2020, where available), second sensitivity (March to July 2020) and supplementary (April to July 2020, as inflated by 5%) analyses all indicated that the suicide rate increased, albeit not significantly, in Croatia.

In conclusion, the number of deaths from suicide in men was decreasing from 2016 to 2020, and this decline continued during the months of the COVID-19 pandemic in Finland.

Timo Partonen, MD, PhD, Mental Health Team, Equality Unit, Finnish Institute for Health and Welfare, Finland; **Olli Kiviruusu**, MSocSc, PhD, Mental Health Team, Equality Unit, Finnish Institute for Health and Welfare, Finland; **Marjut Grainger**, BASc, Mental Health Team, Equality Unit, Finnish Institute for Health and Welfare, Finland; **Jaana Suvisaari**, MD, PhD, Mental Health Team, Equality Unit, Finnish Institute for Health and Welfare, Finland; **Aki Eklin**, Forensic Medicine Unit, Finnish Institute for Health and Welfare, Finland; **Antti Virtanen**, MD, Forensic Medicine Unit, Finnish Institute for Health and Welfare, Finland; **Riitta Kauppila**, MD, PhD, Forensic Medicine Unit, Finnish Institute for Health and Welfare, Finland

Correspondence: Timo Partonen, Email: timo.partonen@thl.fi

First received 9 Jun 2021, final revision 29 Jul 2021, accepted 16 Aug 2021

Supplementary material

To view supplementary material for this article, please visit https://doi.org/10.1192/bjp.2021.136

Data availability

The data are not publicly available due to privacy restrictions. The data that support the findings of this study are available from the corresponding author, T.P., upon reasonable request.

Acknowledgements

We thank Tommi Härkänen, MSc, PhD (Research Manager, Evaluation and Foresight Team, Population Health Unit, Finnish Institute for Health and Welfare, Finland), for advice on statistical analysis.

Author contributions

T.P. and J.S. supervised the entire project and were critically involved in the design, analysis and interpretation of the data. A.E. collected the data. M.G. edited the data for analysis. O.K. analysed the data and wrote the first draft of the manuscript. A.V. and R.K. were involved in the collection of the data and contributed intellectually to the interpretation of the data. All authors contributed to and have approved the final manuscript.

Funding

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Declaration of interest

None.

https://doi.org/10.1192/bjp.2021.136 Published online by Cambridge University Press

References

1 Prati G, Mancini AD. The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychol Med* 2021; **51**: 201–11.

2 Dubé JP, Smith MM, Sherry SB, Hewitt PL, Stewart SH. Suicide behaviors during the COVID-19 pandemic: a meta-analysis of 54 studies. *Psychiatry Res* 2021; **301**: 113998.

3 Pirkis J, John A, Shin S, DelPozo-Banos M, Arya V, Analuisa-Aguilar P, et al. Suicide trends in the early months of the COVID-19 pandemic: an interrupted time-series analysis of preliminary data from 21 countries. *Lancet Psychiatry* 2021; **8**: 579–88.

4 Partonen T, Haukka J, Nevanlinna H, Lönnqvist J. Analysis of the seasonal pattern in suicide. *J Affect Disord* 2004; **81**: 133–9.

5 Stolwijk AM, Straatman HMPM, Zielhuis GA. Studying seasonality by using sine and cosine functions in regression analysis. *J Epidemiol Community Health* 1999; **53**: 235–8.

6 Holopainen J, Helama S, Björkenstam C, Partonen T. Variation and seasonal patterns of suicide mortality in Finland and Sweden since the 1750s. *Environ Health Prev Med* 2013; **18**: 494–501.

7 Pirkola S, Sund R, Sailas E, Wahlbeck K. Community mental-health services and suicide rate in Finland: a nationwide small-area analysis. *Lancet* 2009; **373**: 147–53.

8 Lee Y, Lui LMW, Chen-Li D, Liao Y, Mansur RB, Brietzke E, et al. Government response moderates the mental health impact of COVID-19: a systematic review and meta-analysis of depression outcomes across countries. *J Affect Disord* 2021; **290**: 364–77.

9 Tiirinki H, Tynkkynen LK, Sovala M, Atkins S, Koivusalo M, Rautiainen P, et al. COVID-19 pandemic in Finland: preliminary analysis on health system response and economic consequences. *Health Policy Technol* 2020; **9**: 649–62.

10 Georgieva I, Lantta T, Lickiewicz J, Pekara J, Wikman S, Loseviča M, et al. Perceived effectiveness, restrictiveness, and compliance with containment measures against the Covid-19 pandemic: an international comparative study in 11 countries. *Int J Environ Res Public Health* 2021; **18**: 3806.

11 Haw C, Hawton K, Gunnell D, Platt S. Economic recession and suicidal behaviour: possible mechanisms and ameliorating factors. *Int J Soc Psychiatry* 2015; **61**: 73–81.

EXTRA CONTENT ONLINE

https://doi.org/10.1192/bjp.2021.136 Published online by Cambridge University Press