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Research Letter

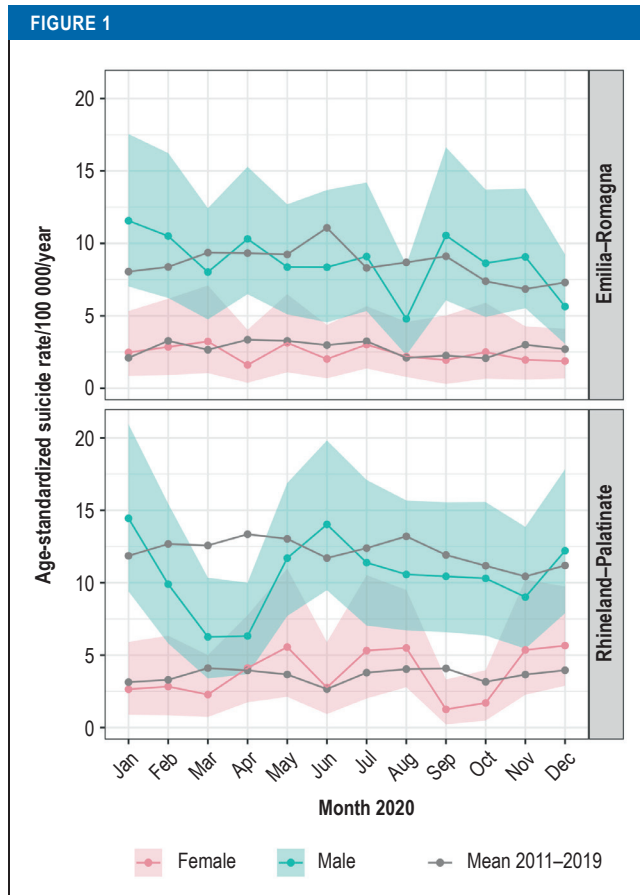
Suicides During the COVID-19 Pandemic 2020 Compared to the Years 2011–2019 in Rhineland–Palatinate (Germany) and Emilia–Romagna (Italy)

The COVID-19 pandemic may negatively affect mental health via stressors such as sustained health concerns, social isolation, unemployment, and loss of income. The risk factors for suicidality can be amplified by exceptional circumstances, and effects on suicidality have been reported in past pandemic emergency situations (1). This has raised concerns about increased suicide rates as an indirect consequence of the COVID-19 pandemic (2). Rhineland–Palatinate in Germany and Emilia–Romagna in Italy are regions that each have populations of around 4 million with similar sociodemographic and economic characteristics. However, Emilia–Romagna was hit harder than Rhineland–Palatinate by the COVID-19 pandemic in 2020, with more than twice as many infections reported and almost five times as many deaths per 100 000 inhabitants (3). Using data from the two regions for the years 2011–2020, we investigated

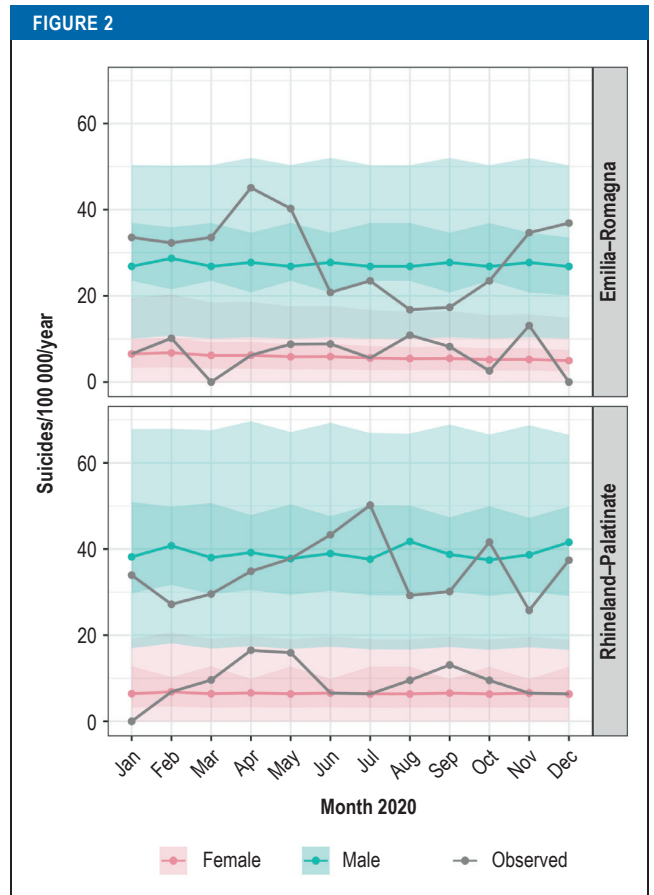
whether the observed suicide rates in 2020 were systematically higher than would be expected from the historical data.

Methods

The mortality registries of Rhineland–Palatinate and Emilia–Romagna provided monthly suicide counts stratified by sex and 10-year age group for the period 2011–2020. Causes of death with an ICD-10 code from X60 to X84 were classified as suicide. The State Statistical Office of Rhineland–Palatinate (www.statistik.rlp.de/de/) and the Italian Institute of Statistics (<http://demo.istat.it/>) provided population figures stratified by sex and 10-year age group. While the counts from Rhineland–Palatinate for 2019 and 2020 had monthly resolution, the remaining monthly population numbers were calculated by linear interpolation between the index populations of the previous year and the following year.



Age standardized suicide rates per 100 000 inhabitants per year for women and men in Rhineland–Palatinate and Emilia–Romagna in 2020 with 95% confidence intervals calculated for the Segi–Doll reference population, together with the corresponding average rates for the period 2011–2019



Predicted suicides per 100 000 person-years in the age group 70+ for women and men in Rhineland–Palatinate (RLP) and Emilia–Romagna (ER) for 2020 with 50% and 95% uncertainty intervals, together with the observed suicides

Age-standardized suicide rates were calculated for the Segi–Doll reference population with 95% confidence intervals. A negative binomial regression model for suicide rate was fitted to the data from 2011–2019 using the Bayesian modeling package brms (4). The cells of the data matrix were defined by month, region (Rhineland–Palatinate, Emilia–Romagna), sex, and three age groups (0–39, 40–69, 70+ years) to ensure a sufficient number of suicides per cell. Covariates were region, calendar year, sex, age group, and the interaction of sex and age group. For 2020, the expected suicide count was calculated as the regression model prediction given the observed population counts. We calculated the point estimates of the prediction as median, the 50% and 95% uncertainty intervals from the 25% and 75% and from the 2.5% and 97.5% quantiles of the posterior distribution, respectively.

Results

In Emilia–Romagna the yearly number of registered suicides ranged from 349 (8.1/100 000 inhabitants) in 2018 to 419 (9.7/100 000) in 2017, with 378 (8.6/100 000) suicides in 2020. The range in Rhineland–Palatinate was from 449 (11.0/100 000) in 2018 to 488 (12.1/100 000) in 2015, with 451 (11.0/100 000) suicides in 2020. The age-standardized suicide rates were higher for men than for women by an average factor of 3.2 (Emilia–Romagna) and 3.3 (Rhineland–Palatinate) (Figure 1). Male suicide rates in Rhineland–Palatinate were consistently higher than in Emilia–Romagna, while female rates were similar. Neither region showed an overall increase in suicide rate during 2020.

In Emilia–Romagna, suicides among males aged 70+ years increased slightly in April 2020 (Figure 2). In Rhineland–Palatinate, suicides among males aged 40–69 years seemed to decrease in March 2020 before returning to the previous level. Among men aged 70+ years in Rhineland–Palatinate, there was an increasing trend from March to July, but counts remained within the 50% uncertainty intervals. In all strata, the observed suicide counts in 2020 were within the 95% uncertainty intervals based on data from 2011–2019. Thus there was no statistical evidence of a systematic increase in suicide rates in 2020.

Discussion

The observed suicide rates in 2020 were consistent with those of the years 2011–2019. Only for persons aged 70+ years, the group with the highest COVID-19 burden, were small deviations observed. These results are in line with previous findings from

natural disasters and with preliminary reports from other countries during the COVID-19 pandemic (5), which did not find increased suicide rates.

A strength of this study is the long observation period. Its limitations include the general potential underreporting of suicides due to misclassification, e.g., as an accident. In particular, differential misclassification of suicides before versus during the COVID-19 pandemic would represent a limitation of this study. Furthermore, our study did not include data on suicidal behavior that did not lead to death. We also had no data on individual risk factors, such as socioeconomic status or unemployment. Longer-term studies are needed to detect pandemic effects on mental health that may unfold more slowly.

We found no evidence for an increase in suicide rates associated with the COVID-19 pandemic in 2020 compared with the years 2011–2019 in Rhineland–Palatinate or Emilia–Romagna.

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Conflict of interest statement

The authors declare that no conflict of interests exists.

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