Article type: Original research

Title: Pandemics and Suicide rates in Spain: From the Spanish Flu to COVID-19

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Conflict of interest: The authors declare no conflict of interest.

Funding: Sergio Sanz-Gómez work is supported by the VI-PPITUS

Acknowlegements: The authors would like to thank Prof. Natividad Sánchez González; Department of Experimental Psychology, Universidad de Sevilla; Seville (Spain) for her early insights in this work. She declares no conflict of interest.

Abstract

Objective: The aim is to examine suicides rates in Spain during the COVID-19 and the Influenza pandemic (1918-1920).

Methods: Data on deaths by cause for the periods 1910-1925 and 2016-2020 were provided by the National Institute of Statistics of Spain.

Results: During the Spanish Flu, a peak of deaths in 1918 due to influenza, acute bronchitis, pneumonia, and other respiratory diseases coincided with an increase in suicides (from 5.9 in 1917 to 6.6 per 100,000 in 1918). The pattern is repeated during 2020, with an increase in suicides from 7.8 in 2019 to 8.3 per 100,000 in 2020. In both cases, the male:female ratio was reduced in similar proportion.

Conclusion: Albeit limited, there is evidence that pandemics may have affected suicide rates. However, most probably this was due to precipitation of different diathesis-stressors factors in each setting, given the different historical contexts.

Keywords: Suicide; Pandemics; COVID-19; Influenza Pandemic, 1918-1919; Spain

Introduction

The COVID-19 pandemic scenario has been identified as a risk factor for suicide[1]. Reasons for this pertain not only the number of related deaths, but also to the high degrees of uncertainty, psychological stress and social isolation that it has implied[2], as well as its potential to aggravate and/or precipitate mental disorders such as anxiety, depression or post-traumatic stress[3]. Previous studies have found increases in suicides related to other epidemics, such as that of the Severe Acute Respiratory Syndrome (SARS)[4] or the Middle East Respiratory Syndrome (MERS)[5].

Expert opinion based on extrapolations with previous pandemics and other natural disasters indicates that an increase in suicides is very likely after a crisis, while there may be a reduction during it[4,6]. However, some authors conclude that there seems to be an inverse correlation between past transnational suicide rates and cumulative COVID-19 cases across countries. Suicide and COVID-19 seem to behave, to some extent, as antagonistic phenomena, posing challenges to prevention[7].

The aim of this study is to test whether there has been an increase in the suicide rate in Spain during the COVID-19 pandemic and to examine the differences and similarities of this scenario with that of the Spanish Influenza pandemic (1918-1920).

Methods

Statistics on deaths by cause for the periods 1910-1925 and 2016-2020 were requested from the National Statistics Institute (Instituto Nacional de Estadística; INE). Statistics for the period 1910 to 1925 belong to the INE documentary collection, which is publicly accessible, and can be consulted here: https://www.ine.es/inebase_historia/mnp.htm. Exhaustive data from 2016 to 2020 are available upon reasonable request to the INE, prior payment of a fee. As this study only used previously published data it was exempt of review board approval by an ethics committee.

We collected the total and disaggregated by sex frequencies of annual deaths during each pandemic for: flu, influenza, and COVID-19, related respiratory diseases, and violent deaths (grouped as suicides and non-suicides).

Due to differences in coding between examined periods, correspondences were established between Dr. Bertillón's causes of death codes, used in Spain at the time, and the codes of the International Classification of Diseases in its tenth version, currently in use[8]. Code 9 (influenza) was compared with influenza deaths (J09, J10 and J11), confirmed COVID-19 (U071) and suspected COVID-19 (U072); code 20 (acute bronchitis) with codes J20, J21 and J22; code 22 (pneumonia) with codes J12-16 and J18; code 23 (other respiratory tract diseases) with codes J30-39; code 35 (violent deaths other than suicide) with codes V00-99; W00-99; X85-99 and Y00-09; and code 36 (suicides) with codes X60-84 and Y87.

To calculate annual death rates per 100,000 inhabitants, annual population censuses were collected for each year. As the INE's historical data for population censuses at the beginning of the 20th century were collected once per decade (1900, 1910, 1920...), to account for the annual population changes for the period 1910-1925 we used as a reference the estimate developed by De Motes for the date of 31 July[9]. This estimate is an interpolation based on the INE data and calculated based on vegetative growth, number of deaths and births, and migratory balance. This new data series was not disaggregated by sex. To calculate the total population of men and women, the proportion recorded in the INE series for the year 1910 has been applied to the annual estimates for the period 1910-1915 and the proportion for the year 1920 to the rest of the period.

Differences in suicides between the first years of each pandemic (1918 and 2020) were compared to their previous years (1917 and 2019). This resulted in net increases (product of the subtraction of suicide deaths and rates) and percentual increases (product of the proportion of increases).

Results

Data on deaths by cause per 100,000 population are shown in figure 1. Due to the disparities on the frequencies of the causes of death examined, resulting in extreme values, a logarithmic representation has been used for the ordinate axis.

Figure 1. Deaths per 100,000 population by cause of death during pandemic periods (1910-1925 and 2016-2020)

During the Spanish Flu period, there was a peak in deaths in 1918, accompanied by marked increases in related diseases (acute bronchitis, pneumonia, and other respiratory diseases; Table 1. To a lesser extent, in the same year, there was an increase in deaths due to suicide. The pattern is repeated during 2020, where the increase in deaths due to COVID-19 is accompanied by an increase in suicides in a similar proportion (Table 2). In both scenarios, males suffer a higher net increase in the number of suicides than females, but females suffer a higher percentage increase. This translates into the male:female suicide ratio being reduced by a similar proportion: from 3.2:1 to 2.8:1 between 1917 and 1918 and from 3.1:1 to 2.9:1 in the case of 2019 to 2020.

Discussion

In both the first year of the Spanish and COVID-19 pandemics, Spain recorded substantial increases in suicide rates. However, far from setting a pattern, it is important to acknowledge marked differences between the two scenarios.

First, the death toll during the Spanish Flu was much higher. Advances in medicine have allowed vaccines to be developed quickly, whereas in the Spanish Flu pandemic, the H1N1 Influenza virus was not isolated until 1933[10]. This, together with the increase and improvement of health facilities over the last century, has served to mitigate the health impact of COVID-19.

Second, the Spanish Flu overlapped in time with World War I. This has been identified as a protective factor for suicide in the countries involved. In a recent study of the Spanish Flu in New Zealand, it was found that the suicide rate decreased during the pandemic period[11]; a similar situation was reported by the same research team using data from the United States[12]. These studies propose that participation in World War I constituted a protective factor, increasing social cohesion in the face of a common struggle. This explanation is consistent with the reverse trend observed in Spain since it did not participate in the conflict.

However, World War I influenced an economic crisis. The country's neutrality led to the modernisation of the metalworking, textile and agricultural industries, but the increase in exports led to domestic shortages, soaring inflation and economic inequalities[13]. In 2020, the consequences of an economic crisis were also present, and although efforts were made to alleviate the economic consequences of the pandemic with aid packages, these were lifted after lockdown period. Times of economic crises have been linked with an increase in suicides. The increase is often delayed in time as economic shocks appear to have an accumulative effect. That was the case in an observed time series study during The Great Depression in USA, in which the peak of suicides was registered in 1932, three years after the Black Tuesday[14]. A similar pattern is observed in Spain during the 2008 economic crisis, in which after an initial decrease, an homologous peak is registered in 2011[15]. It would be interesting to assess suicide rates regarding the interaction between socio-economic level and social protection, more so when research shows how economic crisis impact national suicide rates depending on each country's national strategies for social protection[16]. In fact, a study carried out in Brazil examining suicide deaths during the early days of the pandemic found increases in suicidality groups with poor access to healthcare, such as women, the elderly, non-white people and people with lower educational attainment[17].

Thirdly, during the Spanish Flu, although containment measures were implemented, they were belated[18] and not as strict as confinement or mobility restrictions during 2020, when the period of social isolation was longer[19]. Social distancing has been proposed as an important risk factor for suicidality during the COVID era, as a potential pathway to loneliness and social isolation[20]. Since the early days of the pandemic, addressing loneliness has been a key cornerstone of suicide prevention initiatives[20]. This way, social support has been found to function as a protective factor against suicidal ideation related to fear of COVID-19 and economic hardship during the pandemic[21]. In parallel, in the case of the Spanish Flu, a study revealed that increased social distancing increased suicide rates independently of the flu mortality rate[22].

Since the early days of the COVID-19 pandemic many professional implicated in suicide prevention hypothesised that it would increase suicidality in vulnerable populations[2]. The most notable example may be Japan. This country went from experiencing a steady decline in suicide

deaths since the early 2000s to a significant increase in the summer of 2020, during its third wave of the pandemic. Further exam of suicide trend found that the increase was independent of unemployment and population's alcohol consumption[23].

However, increases in suicide death during the pandemic has not been the norm. An early interrupted time series analysis on 21 high or upper-middle income countries found that suicide trends remained unchanged or even dropped during the first three months of the pandemic[24]. A follow-up study with additional data, comprising 33 countries during 9 to 15 months since the beginning of the pandemic reported a variety of results, including increasing, decreasing, and maintained suicide rates. Often the same country would register all three possibilities in different regions[25]. In this systematic review, economic factors were not associated to suicide trends, probably due to that all countries included were high or upper-middle income countries. In another systematic review focusing on lower and medium income countries, it was found that data on these were scarce, of poor quality or non-existing, which precludes from drawing robust conclusions[26].

This is not the first study to attempt to assess the relationship between epidemics and suicide rates. A recent systematic review concluded that the studies conducted to date are heterogeneous, divergent in methods and with a low degree of evidence, leaving the inference of an association between pandemics and suicidal behaviour unsupported for the time being[27]. Our study shares limitations in terms of the heterogeneity of the situations assessed, and although the current statistics on cause of death are in continuity with those existing in the first study period, numerous modifications to the methodology have accumulated. In addition, the nature of the data collected precludes causal inferences about individual risk factors for suicidal behaviour.

Conclusions

In 1918, when the Influenza pandemic outbroke worldwide, a peak of suicides was registered in Spain. In 2020, when the COVID-19 stroke, Spain reported an increase in suicides of similar proportions. There is evidence, albeit limited, that pandemics have been able to affect the number of suicides, but probably through the precipitation of different diathesis factors in each setting, given different historical contexts. Developing up-to-date statistics on self-harm and suicide to monitor the effect of the current pandemic is an urgent priority. Future research with better methodological features would allow a deeper understanding of the extent of this problem. In any case, these results suggest that suicide has increased during the first year of the COVID-19 pandemic, highlighting the need to implement effective preventive measures to respond to this and others public health crisis.

Clinical points

- The COVID-19 pandemic has re-opened a discussion on the effect of pandemics on population's suicide rates.

- In the case of Spain, a peak of death by suicides was registered on the first year of both the Spanish Flu pandemic (1918) and the COVID-19 pandemic (2020).

- Pandemics may have increased suicide rates in Spain by precipitating different diathesis-stressors factors in each setting,

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