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

Sergio Sanz-Gómez, MSc[a]; Adrián Alacreu-Crespo, Prof[b]; Ana Fructuoso, PhD[c]; María Isabel Perea-González, MSc[a]; Julio Antonio Guija, MD[a,d]; and Lucas Giner, Prof, MD[a]

ABSTRACT

Objective: The aim of this study was to examine suicide rates in Spain during the COVID-19 pandemic and the influenza pandemic of 1918–1920.

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

Results: During the Spanish influenza pandemic, 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 population in 1918). The pattern was repeated in the COVID-19 pandemic during 2020, with an increase in suicides from 7.8 in 2019 to 8.3 per 100,000 population in 2020. In both cases, the male:female suicide ratio was reduced in similar proportion, with a higher net increase in the number of suicides among males but a higher percentage increase among females.

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

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[a]Department of Psychiatry, Universidad de Sevilla, Seville, Spain

[b]Department of Psychology and Sociology, University of Zaragoza, Teruel, Spain

[c]Grupo de Investigación en Neurociencia Clínica de Castilla y León (GINCYL), Valladolid, Spain

[d]Forensic Psychiatry Service, Institute of Legal Medicine and Forensic Sciences of Seville, Seville, Spain

**Corresponding author:* Sergio Sanz-Gómez, MSc, Departamento de Psiquiatría, Facultad de Medicina, Universidad de Sevilla, Avda Sánchez Pizjuán S/N, 41009 Sevilla, Spain (ssanz1@us.es).

The COVID-19 pandemic has been identified as a risk factor for suicide.[1] Reasons for this pertain not only to the number of related deaths, but also to the high degrees of uncertainty, psychological stress, and social isolation that have resulted,[2] as well as the pandemic's potential to aggravate and/or precipitate mental disorders such as anxiety, depression, and posttraumatic stress.[3] Previous studies have found increases in suicides related to other epidemics, such as the severe acute respiratory syndrome (SARS)[4] and the Middle East respiratory syndrome (MERS).[5]

Expert opinion based on extrapolations from 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 was to determine whether there was 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 1918–1920 Spanish influenza pandemic (hereafter, "Spanish flu").

METHODS

Statistics on deaths by cause for the periods 1910–1925 and 2016–2020 were requested from the National Statistics Institute of Spain (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 upon payment of a fee. As this study used only previously published data, it was exempt from 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*, Tenth Revision, currently in use.[8] Code 9 (flu) was compared with influenza deaths (J09, J10, and J11), confirmed COVID-19

Clinical Points

- The COVID-19 pandemic has reopened a discussion of the effect of pandemics on a population's suicide rates.
- In Spain, a peak of deaths by suicide 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-stressor factors in each setting.

(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[9] for the date of July 31. 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 percentage 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.

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 the first year of both the Spanish flu 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.

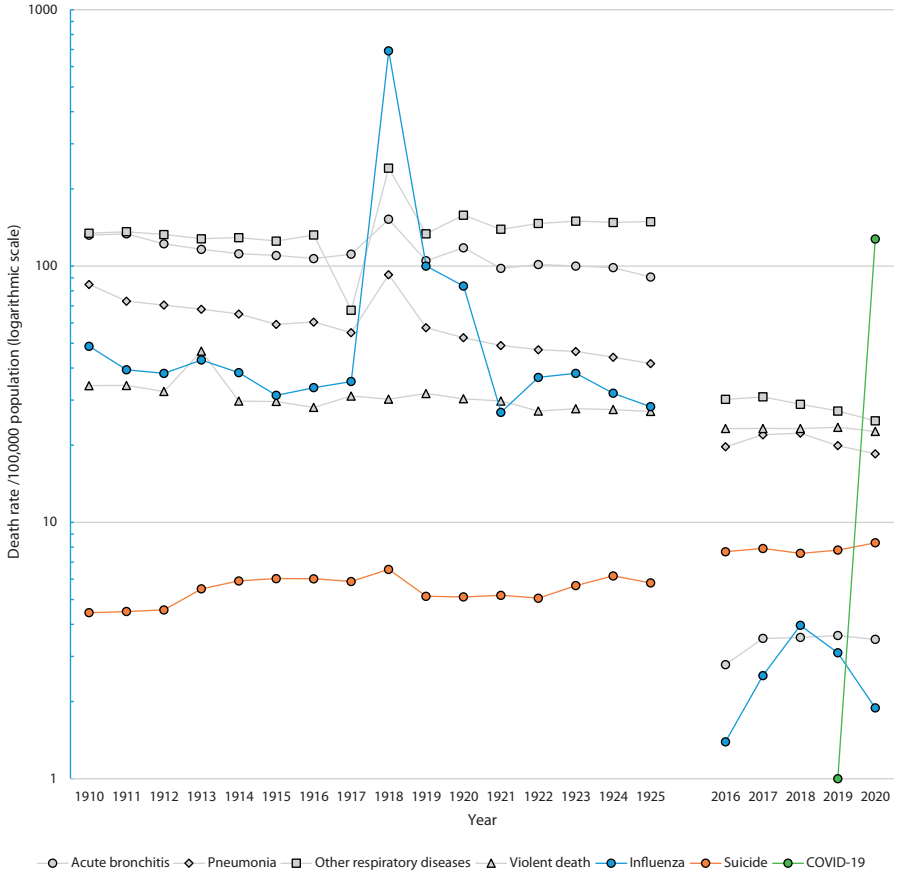
First, the death toll during the Spanish flu was much higher. Advances in medicine have allowed vaccines to be developed quickly, whereas with the Spanish flu pandemic, the H1N1 influenza virus was not isolated until 1933.[10] This, together with the increase and improvement of health facilities over 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 modernization 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 the 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 of suicides during the Great Depression in the US, in which the peak of suicides was registered in 1932, 3 years after Black Tuesday.[14] A similar pattern was observed in Spain during the 2008 economic crisis, in which, after an initial decrease, a homologous peak was registered in 2011.[15] It would be interesting to assess suicide rates regarding the interaction between socio-economic level and social protection, especially when research shows that economic crises 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 health care, such as women, the elderly, nonwhite people, and people with lower educational attainment.[17]

Third, during the Spanish flu, although containment measures were implemented, they were belated[18] and not as strict as confinement or mobility restrictions during

Figure 1. Deaths per 100,000 Population by Cause of Death During Pandemic Periods (1910–1925 and 2016–2020)



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 experts in the area of suicide prevention hypothesized 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 2021, during its third wave of the pandemic. Further examination of the suicide trend found that the increase was independent of unemployment and the population's alcohol consumption.[23]

However, increases in suicide deaths during the pandemic have 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 3 months of the pandemic.[24] A follow-up study with additional data, comprising 33 countries during the first 9 to 15 months after the beginning of the pandemic, reported a variety of results, including increasing, decreasing, and maintained suicide rates.[25] Often, the same country would register all 3 possibilities in different regions. In that systematic review, economic factors were not associated to suicide trends, probably due to the fact that all of the included countries 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 nonexistent, which precludes drawing robust conclusions.[26]

The present study is not the first to attempt to assess the relationship between epidemics and suicide rates. A recent systematic review concluded that the studies conducted to date are heterogeneous, are divergent in methods, and have a low degree of evidence, leaving the inference of an association between pandemics and suicidal behavior unsupported for now.[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

Table 1. Increase in Number of Deaths by Cause in Pandemic Years Over the Previous Year

	1917–1918				2019–2020			
	1917	1918	Net increase	Percentual increase	2019	2020	Net increase	Percentual increase
Influenza/COVID-19[a]								
No. of deaths								
Men	3,699	70,681	66,982	1,810.8%	680	32,833	32,153	4728.4%
Women	3,786	76,433	72,647	1,918.8%	779	28,172	27,393	3516.4%
Total	7,485	147,114	139,629	1,865.5%	1459	61,005	59,546	4081.3%
Deaths/100,000								
Men	36.1	684.1	648.0	1,794.5%	2.9	1.9	−1.0	−34.7%
Women	37.0	739.7	702.8	1,901.6%	3.2	1.9	−1.4	−42.8%
Total	35.4	690.5	655.1	1,848.7%	3.1	1.9	−1.2	−39.0%
Acute bronchitis								
No. of deaths								
Men	12,460	16,930	4,470	35.9%	643	635	−8	−1.2%
Women	11,035	15,486	4,451	40.3%	1,062	1,020	−42	−4.0%
Total	23,495	32,416	8,921	38.0%	1,705	1,655	−50	−2.9%
Deaths/100,000								
Men	121.6	163.9	42.2	34.7%	2.8	2.7	0.0	−1.7%
Women	107.7	149.9	42.2	39.1%	4.4	4.2	−0.2	−4.5%
Total	111.2	152.1	40.9	36.8%	3.6	3.5	−0.1	−3.4%
Pneumonia								
No. of deaths								
Men	6,261	10,420	4,159	66.4%	4,837	4,704	−133	−2.7%
Women	5,349	9,294	3,945	73.8%	4,547	4,064	−483	−10.6%
Total	11,610	19,714	8,104	69.8%	9,384	8,768	−616	−6.6%
Deaths/100,000								
Men	61.1	100.8	39.7	65.0%	20.9	20.3	−0.7	−3.2%
Women	52.2	89.9	37.7	72.3%	18.9	16.8	−2.1	−11.1%
Total	55.0	92.5	37.6	68.4%	19.9	18.5	−1.4	−7.1%
Other respiratory diseases								
No. of deaths								
Men	7,642	26,759	19,117	250.2%	9,749	8,832	−917	−9.4%
Women	6,564	24,571	18,007	274.3%	3,066	2,954	−112	−3.7%
Total	14,206	51,330	37,124	261.3%	12,815	11,786	−1029	−8.0%
Deaths/100,000								
Men	74.6	259.0	184.4	247.2%	42.2	38.1	−4.2	−9.9%
Women	64.1	237.8	173.7	271.1%	12.8	12.2	−0.5	−4.2%
Total	67.2	240.9	173.7	258.3%	27.2	24.9	−2.3	−8.5%
Violent death (except suicide)								
No. of deaths								
Men	4,819	4,717	−102	−2.1%	6,538	6,333	−205	−3.1%
Women	1,752	1,726	−26	−1.5%	4,527	4,383	−144	−3.2%
Total	6,571	6,443	−128	−1.9%	11,065	10,716	−349	−3.2%
Deaths/100,000								
Men	47.0	45.7	−1.4	−2.9%	28.3	27.3	−1.0	−3.6%
Women	17.1	16.7	−0.4	−2.3%	18.9	18.2	−0.7	−3.7%
Total	31.1	30.2	−0.9	−2.8%	23.5	22.6	−0.9	−3.7%

[a]Deaths due to COVID-19 are only registered for the year 2020. In order to calculate a percentual increase, deaths due to both influenza and COVID-19 have been added for the years 2019 and 2020.

Table 2. Increase in Number of Suicides in Pandemic Years Over the Previous Year

	1917–1918				2019–2020			
	1917	1918	Net increase	Percentual increase	2019	2020	Net increase	Percentual increase
No. of suicides								
Men	945	1,034	+89	9.42%	2,771	2,930	+159	5.74%
Women	297	363	+66	22.22%	900	1,011	+111	12.33%
Total	1,242	1,397	+155	12.48%	3,671	3,941	+270	7.35%
Suicides/100,000								
Men	9.2	10.0	+0.8	8.49%	12.0	12.6	+0.6	5.21%
Women	2.9	3.5	+0.6	21.18%	3.7	4.2	+0.5	11.70%
Total	5.9	6.6	+0.7	11.52%	7.8	8.3	+0.6	6.41%

modifications to the methodology have accumulated. In addition, the nature of the data collected precludes causal inferences about individual risk factors for suicidal behavior.

CONCLUSIONS

In 1918, when the influenza pandemic broke out worldwide, a peak of suicides was registered in Spain. In 2020, when COVID-19 struck, Spain reported an increase in suicides of similar proportions. There is evidence, albeit limited, that pandemics have affected the number of suicides, but this effect is 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 other public health crises.

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