

Original Research

A comparison of rate and methods of probable suicide for 2 years pre and post the onset of the COVID-19 pandemic

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Abstract

Objectives: To examine and compare rates and methods of probable suicide in a Western region of Ireland during a 24 month period since the onset of the COVID-19 pandemic compared with a similar period immediately prior to the pandemic onset.

Methods: Post-mortem reports between March 1st 2018 and February 29th 2020 were reviewed and compared with data from March 1st 2020 to February 28th 2022. Relevant demographic data, rates and methods of probable suicide and lifetime engagement with mental health services were compared across the two time points.

Results: Identical rates of probable suicide (85 individuals at both time points) were demonstrated with no difference evident in the utilisation of violent compared to non-violent methods.

Conclusions: This study demonstrates that despite previous reports of increased rates of self-harm and some evidence of increased mental distress since the onset of the COVID-19 pandemic, no change in rates of or methods employed by individuals who died by probable suicide were evident in this geographical region.

Keywords: Suicide; COVID-19; hanging

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Introduction

On March 11th 2020, COVID-19, the infectious disease associated with the coronavirus, SARS-CoV-2 was characterised as a global pandemic by the World Health Organisation (WHO). This pandemic has resulted in significant economic and societal disruption worldwide, and as of May 1st 2023 there have been approximately 765 million cases and approximately 7 million deaths attributable to COVID-19 (World Health Organisation, 2023). The declaration of the pandemic was followed by robust public containment measures with many therapeutic interventions normally available for individuals with mental health difficulties both within and outside the mental health services unattainable during this time, including group psychotherapeutic activities (Alcoholics Anonymous Ireland 2020). Where therapeutic sessions continued, many were forced to adapt to the enforced public health measures, with for example face-to-face interactions often replaced by teleconsultations (Kopelovich et al. 2021; Rojnic Kuzman et al. 2021; Li et al. 2022).

The impact of these prolonged periods of restrictions and lockdowns on individuals' mental well-being is somewhat unclear

with divergent data available to date. Studies in individuals without pre-existing mental health disorders (including in Ireland) have noted an increase in psychiatric pathology, including higher levels of depressive and anxiety symptoms (Wang et al. 2020; Hyland et al. 2020). A relatively modest deleterious psychological impact of COVID-19 for individuals with pre-existing anxiety disorders (Plunkett et al. 2021; Hennigan et al. 2021; McLoughlin et al. 2021), bipolar disorder (McLoughlin et al. 2021) and schizophrenia (Fahy et al. 2021; Rainford et al. 2022) was previously demonstrated; with social functioning most impacted; however, individuals with a diagnosis of Emotionally Unstable Personality Disorder demonstrated both a greater increase in symptomatology and impaired social functioning (McLoughlin et al. 2021).

Despite some initial data noting a reduction in rates of self-harm after the onset of the COVID-19 pandemic (McIntyre et al., 2021a), a 9% increase in rates of self-harm in a study of longer duration (18 months) compared to a similar time-period prior to the COVID-19 pandemic was noted in a West of Ireland study (O'Malley et al. 2023). Other studies have noted minimal changes in relation to self-harm rates but have noted an increase in lethality of methods employed in self-harm episodes, but not an increase in self-harm rates (Jollant et al. 2021; Kar et al. 2021). Given the known association between increased rates of self-harm and subsequent increased rates of suicide (Carroll et al. 2014; Bostwick et al. 2016), an increase in self-harm rates may suggest a risk for increased suicide rates. However, self-harm and suicide are

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different entities with multiple different aetiological factors and thus an increase in self-harm may not be reflected in any change in suicide rates, particularly during a period of societal cohesion. Indeed, previous pandemics have provided inconsistent data regarding suicide rates (Leaune et al. 2020); with initial evidence relating to this current pandemic demonstrating no definitive association with suicide (Pirkis et al. 2021; Deisenhammer and Kemmler 2021). However, studies to date evaluating suicide rates pre and post the onset of the COVID-19 pandemic have been of relatively brief duration (5–12 months) (Odd et al. 2021; Chen et al. 2022).

Consequently, in this study, we wanted to ascertain if there was a difference in rates of individuals dying by probable suicide as evidenced through post-mortems conducted at University Hospital Galway in the 24 months prior to- compared to the 24 months following the onset of the COVID-19 pandemic. Additionally, we wanted to ascertain if methods employed for probable suicide and rate of engagement with mental health service of individuals who died by probable suicide were different across these two time periods.

Methods

Procedure

All post-mortem reports conducted at University College Hospital Galway (UCHG) between 1st March 2018 and 28th February 2022 were examined by the authors (CMCM, DN, DM, LH) to identify individuals who died by probable suicide, defined here as a suicidal act with some prior evidence of intent to die and evidence of self-inflicted injury where the outcome resulted in death. Data from the pre-COVID-19 pandemic period (March 1st 2018–February 29th 2020) was compared with a similar two-year period after the onset of the COVID-19 pandemic in Ireland (March 1st 2020–February 28th 2022). Post-mortem reports included individuals who died in a west of Ireland region including Galway city, and the surrounding more rural regions of Galway and Roscommon, which incorporated a population of 322,602 (City Population (2016) <https://www.citypopulation.de/en/ireland/towns/>)

Post-mortem examinations pertaining to all deaths in Galway city are conducted at UCHG, with approximately 75% of deaths from rural regions of Galway and Roscommon also conducted at UCHG and 25% undertaken at other locations. A senior psychiatrist (BH / DM) and advance nurse practitioner or psychologist (LH, CM, DN) jointly determined based on post-mortem records if individuals had died by “probable suicide” (McMorrow et al. 2022). In-depth details recorded on post-mortem reports by a consultant pathologist were collected for the purposes of this study, including toxicology screenings (detailing alcohol levels, the presence of psycho-active substances, and medication levels); with police reports and witness statements also examined where available. Demographic data including age, gender, vocational and marital status for individuals was collected. Only post-mortems of individuals over the age of eighteen were included in this study. Important considerations in determining if a death was due to probable suicide included the potential method associated with the death of the individual, toxicology screen (drug/alcohol levels in toxic range), and other factors detailed in police reports such as the presence of a suicide note or text. A conservative determination of whether suicide had occurred or not was adopted, with accidental death presumed where uncertainty remained in relation to the cause of death (for example, a single-vehicle car crash resulting in death without

positive toxicology or presence of a suicide note was not considered suicide).

Where it was determined that death was by probable suicide, computerised medical databases for the associated mental health services were examined (DM, LH, PC) to ascertain which individuals had previously attended mental health services. Attendance was considered any contact with a mental health clinician and this included those who may have had a single assessment as well as those who engaged with a care plan, thus throughout this paper, we use the term “attendee” rather than service user to describe this cohort.

Ethical approval was obtained prior to study commencement from the Galway University hospitals Clinical Research Ethics Committee (C.A. 685). As all data were anonymised and consequently written consent was not required.

Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) 27.0 for Windows (SPSS Inc., IBM, New York, USA). Descriptive analyses (frequencies, percentages, means and standard deviation) on key demographic and clinical data were performed for both categorical and continuous variables, as appropriate. We compared data pre and post the onset of the COVID-19 pandemic by utilising the student-t test for parametric data and the Chi-Square (χ^2) test or Fishers’ Exact tests (where appropriate) for non-parametric data.

Results

Table 1 describes selected clinical and demographic variables for participants for both time periods. No difference in age, gender distribution, marital or vocational status was found between the two time periods.

An identical number of individuals died by probable suicide for both time periods ($n = 85$). Similar numbers of deaths were noted for each of the four years examined (48 and 37 in the two years prior to the COVID-19 pandemic, and 39 and 46 in the two years since the onset of the COVID-19 pandemic, ($\chi^2 = 2.00$, $p = 0.57$)). Figure 1 displays the death rate per quartile over the four-year period, with the highest numbers of deaths occurring in June to August 2018 ($n = 16$) and September to November 2021 ($n = 15$).

No difference in the methods employed in probable suicides was found between the two time periods (see Table 1), with death secondary to hanging (pre-COVID-19 = 44 (51.8%), post-COVID-19 onset = 49 (57.6%)), the most common method employed across both time periods. Similarly, low proportions of elevated ethanol in toxicology screens were noted at both time points with 22 individuals (25.9%) having an alcohol level $> 100\text{mMol/l}$ pre-COVID-19 compared to 17 individuals (18.9%) since the onset of the COVID-19 pandemic.

The proportion of individuals with a history of engagement with mental health services were similar across both time periods (Pre-COVID-19: $n = 28$ (32.9%) versus Post-COVID-19 onset: $n = 23$ (27.1%), $\chi^2 = 0.70$, $p = 0.40$).

Discussion

In the 24 months, since the onset of the COVID-19 pandemic, no difference in the rates of probable suicide or methods employed for suicide were found in this study.

Table 1. Demographic and clinical data

Demographic/clinical data	Pre-COVID-19	COVID-19	Statistics
	n (%)	n (%)	χ^2 , df, p
Gender			0.34, 1, 0.56
Male	67 (78.8)	70 (82.4)	
Female	18 (21.2)	15 (17.6)	
Marital Status*			0.27, 3, 1.00**
Single	46 (60.5)	45 (59.2)	
Married	21 (27.6)	22 (28.9)	
Divorced/separated	5 (6.6)	6 (7.9)	
Widowed	4 (5.3)	3 (3.9)	
Employment Status*			6.23, 3, 0.10**
Employed	33 (46.5)	35 (55.6)	
Unemployed	23 (32.4)	22 (34.9)	
Retired	9 (12.7)	6 (9.5)	
Third Level Education	6 (8.5)	0 (0.0)	
Violence of method of death			0.04, 1, 0.84
Yes	70 (82.4)	71 (83.5)	
No	15 (17.6)	14 (16.5)	
Method of Death			3.49, 3, 0.32
Hanging	44 (51.8)	49 (57.6)	
Drowning	24 (28.2)	15 (17.6)	
Overdose	12 (14.1)	12 (14.1)	
Other***	5 (5.9)	9 (10.6)	
Alcohol level (mMol/l)			5.53, 3, 0.14
0	51 (60.0)	64 (75.3)	
179	12 (14.1)	5 (5.9)	
80,199	12 (14.1)	10 (11.8)	
200+	10 (11.8)	6 (7.1)	
Positive Toxicology for Illicit Substances			2.35, 1, 0.13
Yes	13 (15.3)	21 (24.7)	
No	72 (84.7)	64 (75.3)	
Engagement with mental health services			0.70, 1, 0.40
Yes	28 (32.9)	23 (27.1)	
No	57 (67.1)	62 (75.3)	
	Mean (SD)	Mean (SD)	t, p
Age	45.5 (16.8)	46.3 (16.6)	0.30, 0.76
Alcohol Level	55.0 (86.4)	36.5 (75.5)	1.49, 0.14

χ^2 (chi-square), df (degrees of freedom), p (p value) t (t statistic),.

*Data not available on all participants.

**Fisher's Exact Test.

***Other types of suicide included poisoning, gun-shot, road traffic accidents, self-mutilation and self-asphyxiation.

Our findings are consistent with a number of recent studies pertaining to the COVID-19 pandemic (Radeloff et al. 2021; Workman & de Jong, 2023). Only one study conducted in West Michigan has similarly collected data over a 2 year time-period pre- and post- the COVID-19 pandemic noted and demonstrated no difference in probable suicide rates (Workman & de Jong, 2023). Similarly, a study over an 18 month period (pre- and post the

COVID-19 pandemic) in Japan noted no statistically significant overall change in rates of probable suicide, although higher rates in younger people were demonstrated (Yoshioka et al. 2022). A Canadian study noted that probable suicide rates decreased in the year following the onset of the COVID-19 pandemic, which the authors attributed to extraordinary public health measures (McIntyre et al. 2021b), however only provisional data was available to the

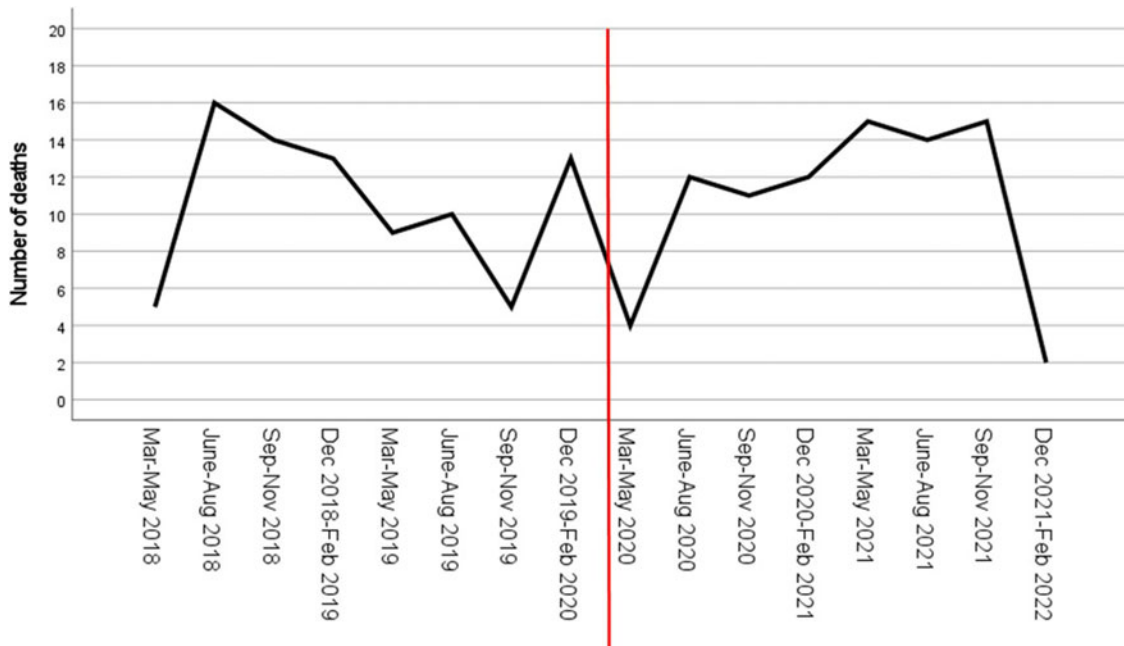


Figure 1. Deaths pre- and post-COVID-19 pandemic.

authors at the time of publication and thus data pertaining to rates of probable suicide may have been underestimated due to reporting delays.

A number of studies of shorter duration have demonstrated contrasting results. For example, a 6-month study in Norway noted no difference in probable suicide rates (Knudsen et al., 2021). However a study in Mexico city identified a doubling in the rates of probable suicide in the first 9 months following the onset of the pandemic, (Borges et al., 2022), although rates of probable suicide in the subsequent 9 months were similar to those prior to the COVID-19 pandemic (García-Dolores et al. 2023). The authors attributed the initial increase in probable suicides (predominantly in younger people) to a lack of quality internet services and computer access, exacerbating social isolation to a greater degree than in countries such as Ireland with more developed communications technology (García-Dolores et al. 2023). A study in Hungary similarly noted an increase in suicide rates in the 9 months following the COVID-19 pandemic with an increase in the number of deaths by violent methods also evident (Balint et al. 2023). Other studies, similar to the current study did not find an association between violent method of suicide and the post-pandemic period (García-Dolores et al. 2023).

Our findings are in conflict with some historical evidence from events such as the 1918–19 influenza pandemic and the 2003 SARS epidemic which noted a modest increase in suicide rates (Gunnell et al. 2020). However, a systematic review and meta- concluded that there was minimal robust evidence linking infectious epidemics with suicide (Rogers et al. 2021).

There are a number of potential supportive factors that might have reduced rates of probable suicide. Mental health supports both within and outside mental health services predominantly continued, even though these were often delivered via tele-consultations (Kopelovich et al. 2021; Rojnic Kuzman et al. 2021; Li et al. 2022). Similarly, social engagement continued via social media ensuring human contact remained possible given the predominantly good quality internet services in Ireland.

Additionally, governmental support including “pandemic payments” for individuals who had reduced incomes secondary to COVID-19 pandemic-related restrictions, reduced the severity of potential financial difficulties (often a significant stressor) for many individuals.

This study is associated with a number of limitations. Findings from this study may not be generalisable to other geographical settings, however, the study incorporated both rural and urban regions. As this study is cross-sectional, causality between variables cannot be definitively established. While we have verified all individuals who died by probable suicide across the three local mental health public services databases, some individuals may have attained support utilising private health services, however, this would have been similar across both time periods and given the lack of private mental health services in the region, likely represents a relatively small cohort of individuals. Finally, whilst our sample size is comparatively small, the identical number of individuals who died by probable suicide over the course of 48 months potentially supports the validity of the study findings.

Conclusion

This study demonstrates that despite some evidence of increased mental distress and self-harm, the rate of probable suicide or methods employed in probable suicides has remained unchanged in the twenty-four month pre- and post- the onset of the COVID-19 pandemic.

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Author contribution. All authors participated in the design of the study, data attainment and critical review of the manuscript.

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Competing interests. The authors declare that they have no conflict of interest. All authors have seen and approved the final version of the manuscript and believe that the manuscript represents work completed.

Ethical standards. Ethical approval was obtained from the Galway University Hospitals Research Ethics Committee (C.A. 685). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation with the Helsinki Declaration of 1975, as revised in 2008.

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