



Increased incidence of high-lethality suicide attempts after the declaration of the state of alarm due to the COVID-19 pandemic in Salamanca: A real-world observational study

Llanyra García-Ullán^{a,b,c}, Javier I. de la Iglesia-Larrad^{a,b}, Diego Remón-Gallo^{b,c}, Nerea M. Casado-Espada^{a,b,c}, Sinta Gamonal-Limcaoco^a, María Teresa Lozano^a, Lourdes Aguilar^{a,b,c}, Carlos Roncero^{a,b,c,*}

^a Psychiatry Service, University of Salamanca Health Care Complex, Salamanca, Spain

^b Institute of Biomedicine of Salamanca (IBSAL), University of Salamanca, Salamanca, Spain

^c Psychiatry Unit, School of Medicine, University of Salamanca, Spain

ARTICLE INFO

Keywords:
COVID-19
Suicide
Risk factors

ABSTRACT

The coronavirus pandemic has led to people getting involved in harmful behaviors. In our observational study, we assessed 241 patients with suicidal thoughts or behaviors in the emergency room before, during, and after the lockdown, from January to July 2020. After the lockdown, retired patients made higher-lethality attempts, and consultations related to suicide were less frequent, but active suicidal behaviors were more frequent. Men tended to use more lethal methods, and women made more suicidal gestures and had more suicide-related consultations. We observed an increase in the lethality of the attempts after the declaration of the state of alarm.

1. Introduction

Most cases of suicide are associated with psychiatric illnesses: depression, substance abuse, and psychosis are the most relevant risk factors, followed by anxiety, personality disorders, eating disorders, and traumatic events (Sher, 2020a). The current coronavirus pandemic, which is the most critical public health problem this generation has faced (Martin et al., 2021), falls into the latter category. Herein, we investigate the influence of the COVID-19 pandemic (Sher 2020b), the declaration of a state of alarm, and other factors, on the incidence of suicidal behaviors in Salamanca (Spain).

2. Materials and methods

We conducted an observational study and analyzed the data of the 241 patients referred for evaluation by on-call psychiatrists for self-harm or suicidal ideation at the University of Salamanca Healthcare Complex (USHC) between January 1, 2020, and July 31, 2020. Generally, patients who express suicidal thoughts to a triage nurse or an emergency doctor are referred to the on-call psychiatrists. Those who visit or get transferred to the emergency room due to self-harm are referred to the

on-call psychiatrists as soon as their vital signs are stabilized and their level of consciousness is suitable for a psychiatric interview. This protocol means that on-call psychiatrists evaluate every patient with suicidal ideation or self-harm, except for those cases where medical stabilization fails at the emergency room (resulting in the patient's death or in a referral to the intensive care unit). Suicidal intention is evaluated by a clinical interview, and this report is added to the electronic medical record of the patient. In this study, we retrospectively reviewed these reports provided by the on-call psychiatrist.

The clinical and demographic characteristics assessed included sex, age, date of consultation/referral, type of environment (rural vs. urban), suicidal methods employed, drugs used (including alcohol, cannabis, nicotine, unprescribed benzodiazepines, unprescribed opiates, illicit use of amphetamines), motives for suicide (existential, economic, social, familiar, the pandemic itself...), employment, social and marital status, diagnosis, and the therapeutic plan made by the psychiatrists. A code system was agreed upon by the investigators (different from those who evaluated the patients and wrote the reports) in order to codify the relevant information gathered. Suicidal behaviors are specifically labelled as impulsive when they are caused by an urge to self-harm without previous plans and generally occur in reaction to some acute

* Corresponding author at: Psychiatry Service, University of Salamanca Health Care Complex, Paseo de San Vicente 58-182, 37007, Salamanca, Spain.

E-mail address: croncero@saludcastillayleon.es (C. Roncero).

<https://doi.org/10.1016/j.psychres.2022.114578>

Received 20 April 2021; Received in revised form 19 April 2022; Accepted 24 April 2022

Available online 26 April 2022

0165-1781/© 2022 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

stress factor; this is followed by an almost instantaneous feeling of regret. Other self-harm episodes are labelled as extrinsically motivated when motivations other than death are detected alongside the desire for self-destruction (for example, self-harm with punitive or manipulative intentions). Forms of self-harm that were non-suicidal were not included in the study. Reasons for referral or consultation were divided into high- and low-lethality suicide methods (Lim, 2014) and suicidal thoughts. We analyzed the influence of the coronavirus crisis, taking the declaration of the first state of alarm on March 14, 2020 as a reference. The state of alarm resulted in a mandatory lockdown, among other measures, and free movement was significantly restricted during this period. These conditions could have an impact on mental health and suicidality. In order to analyze how lockdown (not simply the COVID crisis in general) affected our population, we additionally divided the period we studied into three different intervals: before, during, and after the first state of alarm ended on June the 21st 2020.

3. Results

3.1. Comparison between the pre- and post-declaration of the state of alarm

We observed more cases of suicidality before the declaration of the state of alarm. The proportion of retired patients was three times higher among the patients evaluated for suicidal thoughts and acts after the state of alarm than before. We further observed a qualitative difference between the number of attempts/gestures via injuries before and after

the declaration of the state of alarm (no injuries were registered pre-lockdown). Suicidal motivations remained equally prevalent, except for the proportion of patients who gave existential reasons, which was 2.79 times higher before the state of alarm than after. The incidences of suicidal thoughts, drug overdoses, and self-inflicted cuts did not vary significantly. Students were assessed twice as frequently before than after the declaration of the state of alarm. No statistically significant difference was found in the proportions of sex, marital status, or rural/urban residence.

Extrinsic motivations for a suicidal attempt were mostly seen in women (37.1% vs. 24.5%, $p = 0.04$). Most of the patients who made consultations due to suicidal thoughts were men (49% vs. 29, 4%, $p < 0.05$). Drug overdose was more common in women (62.9% vs. 36.7%, $p < 0.05$), although drug users were predominantly men (61.2% vs. 42.7% $p < 0.05$).

3.2. Comparison between the three periods, including pre-lockdown (pre-state of alarm), lockdown, and post-lockdown

There were more active workers among the patients evaluated during the lockdown period. No differences were found in other variables (including gender, marital status, working status, family history, motives, or drug abuse) beside employment status.

Table 1.

Table 1

Prevalence of the different sociodemographic and clinical variables, different consultation motives, gender differences, and variations in frequency along with the two-period and three-period scenarios. ¹ Results for which the chi-squared test is unapplicable due to expected counts < 5 .

			Pre-lockdown		Post-lockdown		P	
Total			n	Percentage (N = 96)	n	Percentage (N = 145)		
Type								
	Suicidal thoughts	126	54	56.3%	72	49.7%	0.392	
	Overdose	16	3	2.9%	13	9.0%	0.316	
	Cuts	6	0	0.0%	6	4.1%	0.075 ¹	
	Fall	4	0	0.0%	4	3.8%	0.044 ¹	
	Hanging	4	0	0.0%	4	3.8%	0.101 ¹	
Hospitalization		53	18	18.8%	35	24.1%	0.345	
Rural origin		109	46	47.9%	63	43.4%	0.495	
Marital status								
	Single	92	38	39.6%	54	37.2%	0.714	
	Married	62	22	22.9%	40	27.9%	0.417	
	Separated/divorced	41	18	18.8%	23	15.9%	0.559	
	Widower	12	4	3.8%	8	5.5%	0.637 ¹	
	Partner	34	14	14.6%	20	13.8%	0.863	
Laboral Status								
	Student	43	24	25.0%	19	13.1%	0.025	
	Active	69	26	27.1%	43	29.7%	0.665	
	Inactive	41	20	20.8%	21	14.5%	0.199	
	Unemployed	30	10	10.4%	20	13.8%	0.437	
	Temporarily incapable	5	0	0.0%	5	3.4%	0.066 ¹	
	Permanently incapable	22	9	9.4%	13	9.0%	0.914	
	Retired	31	7	7.3%	24	16.6%	0.036	
Family history		56	23	24.0%	33	22.8%	0.829	
Drug Users		121	49	51.0%	72	49.7%	0.833	
			Suicidal Thoughts		Low Lethality		High Lethality	
3 periods lethality			Total (N = 241)		n		%	
			n	%	n	%	n	
Gender ($X^2=0.001$)								
	Women	143	42	29.4%	89	62.2%	12	8.4%
	Men	98	48	49.0%	36	36.7%	14	14.3%
Two Periods ($X^2=0.026$)								
	Pre-declaration	96	39	35.9%	53	55.2%	4	4.2%
	Post-declaration	143	51	35.2%	72	49.7%	22	15.2%
Three Periods ($X^2=0.154$)								
	Pre-State of Alarm	96	44	45.8%	45	46.9%	7	7.3%
	During State of Alarm	85	26	30.6%	46	54.1%	13	15.3%
	Post-State of Alarm	60	20	33.3%	34	56.7%	6	10.0%

3.3. High/low lethality and the two- and three-period scenarios

There was a greater proportion of active suicidal behaviors after the declaration of the state of alarm, and fewer patients made consultations due to suicidal thoughts. More high-lethality methods were evaluated after the declaration. Women used low-lethality methods approximately three times more than men. However, the use of high-lethality methods was not significantly associated with gender. Retired and older patients were four and five times more likely to fall into the high-lethality attempt category than patients with other employment statuses and younger patients, respectively. Lethality (low or high) was not associated with any other risk factors.

3.4. Loglinear analysis

Variables associated with a greater prevalence of both high and low lethality attempts (gender, age older than 65 years, and being retired) were included in two log-linear analyses to assess for interactions: one with high-lethality methods, and the other with low-lethality methods.

Four-way log-linear analysis led to a final model that retained two effect interactions related to the use of low-lethality suicide methods. Sex had a significant second-order interaction with low lethality.

Two interaction effects were significant when applying four-way log-linear analysis with high lethality, gender, age older than 65 years, and retirement. However, high lethality did not interact with other variables.

4. Discussion

Our results confirmed the previous evidence on risk factors: men tend to use more lethal methods, while women consult more often due to suicidal thoughts (Turecki and Brent, 2016) and tend to use less lethal methods. The association between higher lethality and older age is also consistent with published evidence (Yang et al., 2020). There appeared to be a tendency toward homogenization of the gender differences observed within the first period; however, it was not statistically significant. Based on the literature, this high prevalence of high-lethality attempts among active workers was not expected (Bachmann, 2018).

The number of consultations related to suicidality in the emergency room remained constant; however, the lethality of the means employed increased. The state of alarm could have dissuaded the population from accessing the hospital, given the fear of contagion and the legal limitations to movements. Hence, more people than usual could have contained their less structured thoughts while avoiding the hospital (Mamun and Ullah, 2020). As we observed an increase in the lethality of the attempts evaluated after the declaration of the state of alarm (Mohan et al., 2020), our sample consisted of a selected number of patients classified as the highest risk. Alternatively, the state of alarm possibly delayed consultations. Indeed, there may have been a wave of patients who planned to seek medical attention after the state of alarm who remained undetected during that period.

Fewer students presented for treatment after the state of alarm was declared, probably because many students were native to other Spanish cities and could have returned home after all daily activities were interrupted, as in other universities (Chang et al., 2020). Regarding active workers, the conditions faced by many industries and employers owing to their halted activities may have caused drastic changes in their situation, explaining the higher rate of suicidality in this group (Kawohl and Nordt, 2020). However, long-term studies are needed to clarify these points.

Our data were extracted from only psychiatric evaluations, and we excluded suicidal acts only assessed by emergency doctors. However, this is a real-world study with a heterogeneous population, making the results generalizable to many other comparable environments.

5. Conclusion

The COVID-19 crisis and the subsequent lockdown and state of alarm were linked to an increase in lethality specifically associated with male gender, age over 65 years, and retired employment status in Spain. An existential motivation for suicide was more prevalent before the state of alarm than after. Investigating the long-term effects of COVID-19 on suicide is essential to identify the groups at highest risk of suicide.

CRedit authorship contribution statement

Llanyra García-Ullán: Conceptualization, Investigation, Methodology. **Javier I. de la Iglesia-Larrad:** Conceptualization, Data curation, Methodology, Writing – review & editing. **Diego Remón-Gallo:** Conceptualization, Investigation, Methodology, Software. **Nerea M. Casado-Espada:** Data curation. **Sinta Gamonal-Limcaoco:** Writing – review & editing. **María Teresa Lozano:** Data curation. **Lourdes Aguilar:** Validation, Visualization. **Carlos Roncero:** Conceptualization, Methodology, Resources, Supervision, Validation, Visualization.

Declaration of Competing Interest

Dr. Carlos Roncero has carried out the PROTEUS project, which was funded by a grant from Reckitt-Benckiser/Indivior and the COSTEDOPIA project, which was funded by INDIVIOR. He received two medical education grants by Gilead and medical writing support from Abbvie, has received fees to give lectures for JanssenCilag, Indivior, Servier, GSK, Astra, Gilead, MSD, Sanofi, Excelsis, Abbvie, Takeda Rubio and Casein. He has received financial compensation for his participation as consultant or a board member for Lundbeck, Gilead, MSD, Mundipharma, INDIVIOR, Excelsis, Martindale, Camurus, Gebro and Abbvie, and has received support by Castile and Leon's (Spain) Regional Management of Health (GRS COVID 59/A/20) Scholarship for the project Impacto y abordaje de la salud mental de los pacientes afectados por COVID, sus familiares y del personal sanitario que los atiende. (Impact and approach on the mental health of patients affected by COVID, their families and the health professionals who care for them).

Dr. Javier I. de la Iglesia-Larrad has received honoraria for a presentation for Sanofi and has been given formation and a contract for La Roche as a rater in a clinical essay.

The rest of the author declare to have no other conflicts of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2022.114578.

References

- Bachmann, S., 2018. Epidemiology of suicide and the psychiatric perspective. *Int. J. Environ. Res. Public Health* 15 (7), 1425. <https://doi.org/10.3390/ijerph15071425>.
- Chang, J., Yuan, Y., Wang, D., 2020. Mental health status and its influencing factors among college students during the epidemic of COVID-19. *Nan Fang Yi Ke Da Xue Bao* 40 (2), 171–176. <https://doi.org/10.12122/j.issn.1673-4254.2020.02.06>.
- Kawohl, W., Nordt, C., 2020. COVID-19, unemployment, and suicide. *The Lancet Psychiatry* 7 (5), 389–390. [https://doi.org/10.1016/S2215-0366\(20\)30141-3](https://doi.org/10.1016/S2215-0366(20)30141-3).
- Lim, M., Lee, S.U., Park, J.I., 2014. Difference in suicide methods used between suicide attempters and suicide completers. *Int. J. Ment. Health Syst.* 8, 54. <https://doi.org/10.1186/1752-4458-8-54>.
- Mamun, M.A., Ullah, I., 2020. COVID-19 suicides in Pakistan, dying off not COVID-19 fear but poverty? The forthcoming economic challenges for a developing country. *Brain Behav Immun* 87, 163–166. <https://doi.org/10.1016/j.bbi.2020.05.028> pmid: 32407859.
- Martin, C., Andrés, P., Bullón, A., et al., 2021. COVID pandemic as an opportunity for improving mental health treatments of the homeless people. *Int. J. Soc. Psychiatry* 67 (4), 335–343. <https://doi.org/10.1177/0020764020950770>.
- Mohan, C., Tembo, V., McNicholas, B., Doherty, A.M., 2020. Defining high risk by clinical lethality: the different characteristics and management of the survivors of serious self-injury admitted to critical care, compared with lower lethality self-injury. *Gen. Hosp. Psychiatry* 64, 131–132. <https://doi.org/10.1016/j.genhosppsych.2020.02.004>.

- Sher, L., 2020a. An infectious disease pandemic and increased suicide risk. *Braz J Psychiatry* 42 (3), 239–240. <https://doi.org/10.1590/1516-4446-2020-0989>.
- Sher, L., 2020b. The impact of the COVID-19 pandemic on suicide rates. *QJM* 113 (10), 707–712. <https://doi.org/10.1093/qjmed/hcaa202>.
- Turecki, G., Brent, D.A., 2016. Suicide and suicidal behaviour. *Lancet* 387 (10024), 1227–1239. [https://doi.org/10.1016/S0140-6736\(15\)00234-2](https://doi.org/10.1016/S0140-6736(15)00234-2).
- Yang, Y., Li, W., Zhang, Q., Zhang, L., Cheung, T., Xiang, Y.T., 2020. Mental health services for older adults in China during the COVID-19 outbreak. *The lancet. Psychiatry* 7 (4), e19. [https://doi.org/10.1016/S2215-0366\(20\)30079-1](https://doi.org/10.1016/S2215-0366(20)30079-1).