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ORIGINAL BREVE

Acute poisoning among patients attended to in an emergency department: from the pre-pandemic period to the new normality

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Abstract
Background: The COVID-19 pandemic has caused global changes that affect the daily life of the world’s population, with a direct impact on individuals’ physical and mental health as well as on their social and recreational habits.

Methods: This study aimed to retrospectively analyze the demographic and clinical characteristics of patients attended to for acute poisoning in a hospital emergency department (ED) at three different periods of time: pre-pandemic (2019), after strict lockdown of the population in Spain (2020), and post-pandemic (2021). We analyzed 2 months (June and July) in each period.

Results: A total of 1,182 cases of acute poisoning were included. Compared to the pre-pandemic period, during lockdown, the number of patients with acute poisoning decreased (2019: 1.9% vs. 2020: 1.5%; p < 0.01); the ratio of men to women increased (2.0 vs. 1.4; p = 0.02); and the mean age of patients increased (2019: 31.4 vs. 2020: 41.3; p < 0.001), a trend which continued in 2021 (38.3). Poisoning with suicidal intention also increased during the pandemic (2019: 8.71% vs. 2020: 21.0%; p < 0.01) whereas poisonings with a recreational intention declined (2019: 76.1% vs. 2020: 62.0%; p < 0.01) with a non-significant increase in 2021 (69.0%, p = 0.07).

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Introduction

The elevated virulence and capacity for spread of SARS-CoV-2 infection compelled the World Health Organization (WHO) to declare a pandemic in March 2020. In order to guarantee a minimal level of operation of various healthcare systems, governments decreed a series of restrictive measures—unprecedented at that time—with the aim of preventing transmission between human beings and avoiding the collapse of these systems. 

The Spanish government declared a nationwide state of alarm on March 14, 2020 with a strict at-home lockdown of the population (except for essential workers) for practically 99 days, until June 21, 2020. These restrictive at-home lockdown measures resulted in a decline in the influx of adults to emergency departments (ED) and an increase in telephone consultations to emergency department management centers and outpatient emergency care departments.

Emergencies due to acute poisoning attended to also significantly declined, especially those that occur in recreational settings, though they did not entirely disappear as would be expected after the aforementioned measures were decreed specifically to impede any social contact. Similar data have been obtained in very recent studies concerning the population attended to in pediatric EDs, where a worrying increase in poisonings with suicidal intentions has been noted in these young patients.

After the first year of the pandemic, measures restricting mobility were relaxed in summer 2021 and some recreational and social activities partially returned to normal. However, the repercussion of this de-escalation on poisonings has not specifically been analyzed. For the first time in advance of other countries with a more deeply rooted tradition in the epidemiological study of poisonings, this study was conducted with the aim of analyzing the evolution of poisonings attended to in three different periods of the pandemic and the impact that the various pandemic control measures enacted may have had on poisonings.

Materials and methods

This work is a retrospective, observational study conducted by means of a review of electronic medical records. It includes all patients attended to for acute poisoning in the ED of the Son Espases University Hospital in the months of June and July over three consecutive years (61 days each

Conclusion: The COVID-19 pandemic generated clinical and epidemiological changes in the acute poisonings attended to in a hospital emergency department during the various phases of the pandemic.
2019 (pre-pandemic period), 2020 (lockdown period and start of de-escalation), and 2021 (period of reactivation of social activities). This study was approved by the Research Ethics Committee of the Balearic Islands (file no. IB 4679/21 PI dated 10/27/2021).

The statistical analysis was conducted by means of a univariate descriptive analysis of the variables included in the study (sex, age, and origin of the poisoned individual; reason for the poisoning; type of poison; whether digestive decontamination measures were taken; use of antidotes; patient restraint measures; destination; hospital stay; and death).

Student’s t-test and Fisher’s exact test were used for the bivariate analysis. The chi-square test (and corresponding non-parametric tests when the conditions for its use were not met) was used to evaluate the relationship between categorical variables, calculating the corresponding confidence intervals.

Results

A total of 1,182 poisoned patients were included. As shown in Table 1, compared to the pre-pandemic period, the number of acute poisonings declined significantly after 2019, mainly in 2020 (2019: 1.9% vs. 2020: 1.5%; p < 0.01) whereas the ratio of men to women (2.0 vs. 1.4; p = 0.02) and the mean age of poisoned individuals increased (31.4 vs. 41.3; p < 0.001). Suicidal poisonings also rose during the pandemic (8.71% vs. 21.0%; p < 0.01) as did pharmaceutical poisonings (14.20% vs. 28.76%; p < 0.01). As a consequence, the proportion of poisoned individuals who required digestive decontamination measures (0.95% vs. 4.7%; p < 0.00) and hospitalization also rose (2.46% vs. 5.35%; p < 0.05). On the contrary, poisonings with recreational drugs declined notably (76.1% vs. 62.0%; p < 0.01) as did the number of patients of foreign origin (50.6% vs. 4.7%, p = 0.00).

The results from the final period (summer 2021) compared to the year before the pandemic (2019) confirm some of these trends, though the increase in poisonings with suicidal intentions (2019: 8.7% vs. 2021: 16.3%; p = 0.00), poisonings with pharmaceuticals (14.2% vs. 26.2%; p = 0.000), and poisonings that required hospitalization (2.5% vs. 5.9%; p = 0.01) persisted.

The percentage of poisonings in women increased again (33.1% vs. 41.4%; p = 0.04). After the relaxation of restrictive measures in summer 2021, recreational poisonings with illegal drugs (14.0% vs. 32.7%; p = 0.00) and poisonings among patients of foreign origin reappeared (11.4% vs. 31.8%; p = 0.00).

Discussion

Most of the epidemiological results on acute poisonings attended to in these periods differ from those obtained in previously published studies, such as the series by Baeza on three public hospitals in the south of Spain in which the prevalence of poisonings remained constant year after year. In that study, they were fundamentally influenced by the hospital’s location (urban or rural area) and seasonal variability.9

In our series, we documented a change in the annual stability of the number of intoxicated patients attended to, with healthcare data that are in a certain way parallel to the various pandemic and lockdown scenarios experienced.

In line with what has recently been described by Gunnell et al., who already raised an alarm about the increase in psychological problems and risk of suicide during the pandemic,10—our results show a rise in the number of poisonings with suicidal intention, with double the number of relative percentages of these poisonings in the years 2020 and 2021 compared to the pre-pandemic period. There was also a change in the type of poison used in these suicidal acts, with a notable increase in poisonings with pharmaceuticals. These are usually associated with greater severity, an increase in the need for therapies used for poisonings (digestive decontamination and use of antidotes), more hospitalizations, and longer mean hospital stays. Paradoxically, we did not detect the increase in mortality reported in other studies, which described a rise in the mortality of suicidal poisonings compared to the rest of poisonings.10

On the other hand, as was recently suggested by Fernández-Lázaro et al., there was an initial increase in the ratio of men to women which tended to normalize in the final period (2021) and a decline in the mean age of poisoned individuals. A worrying increase in suicidal poisonings among youths was also detected.7 Along these lines, we consider it of utmost importance that the government strengthen efforts to care for mental health and prevent suicidal behaviors. One example of this is the 2021–2024 Mental Health and COVID-19 Action Plan,11 which is complementary to the Mental Health Strategy approved in 2006.

The disparity in the restrictive measures in different European countries limited the resurgence of recreational poisonings with illegal drugs. In our hospital, which is located in a highly touristic area, patients who fit this profile tended to be foreign citizens, mainly British, and our hospital remains far from the pre-pandemic numbers we saw. During the two months of the study in 2021, the United Kingdom required residents who returned from our country to quarantine,12 which influenced the influx of tourists from this point of origin; they represented nearly one-third of poisoned individuals in 2019. It should not be forgotten that during summer 2021, most night entertainment activities (clubs, etc.) and local celebrations were canceled. This helped partially control the excesses that occur in these settings.

The idiosyncrasy of our hospital’s location in a touristic area is a limitation of this study, as it conditions the results obtained and hinders their extrapolation to other areas where tourism has a lesser influence. On the contrary, mass gatherings—Spain’s macrobotellones, or outdoor drinking parties—organized via social media proliferated, temporarily substituting the aforementioned entertainment.13

In conclusion, the COVID-19 pandemic generated clinical and epidemiological changes in the type of poisoned patient attended to in a hospital ED during the various phases. Strictly in a toxicological sense, all signs point to this new normality not leading to an improvement in the sociodemographic or clinical profile compared to the past given that, based on our results, it is expected that the rise in suicidal poisonings detected will converge with poisonings arising from the reemergence of recreational and entertainment activities.
Table 1  Demographic and healthcare data of poisoned individuals attended to in the emergency department of a university hospital in the months of June and July of the years 2019, 2020, and 2021 and a statistical comparison of the results between the periods of 2020 vs. 2019, 2021 vs. 2020, and 2021 vs. 2019.

|                      | 2019          | 2020          | p value (20/19) | 2021          | 2021          | p value (21/20) | p value (21/19) |
|----------------------|---------------|---------------|----------------|---------------|---------------|----------------|----------------|
### Table 1 (Continued)

|                          | 2019         | 2020         | 2021         | 2021         | 2021         | 2021         |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                          | N            | % (95% CI)   | N            | % (95% CI)   | N            | % (95% CI)   |
| Pharmaceuticals          | 75           | 14.2 (11.23–17.18) | 86           | 28.8 (23.63–33.89) | 0.00         | 93           | 26.2 (21.62–30.77) | 0.52 | 0.00 |
| Others                   | 37           | 7.0 (4.83–9.18)  | 46           | 15.4 (11.30–19.47) | 0.00         | 37           | 10.4 (7.24–13.60)  | 0.07 | 0.10 |
| Digestive decontamination|              |              |              |              |              |              |
| Yes                      | 5            | 0.9 (0.12–1.77)  | 14           | 4.7 (2.29–7.08)  | 0.00         | 18           | 5.1 (2.79–7.35)  | 0.96 | 0.00 |
| Activated charcoal       | 5            | 0.9 (0.12–1.77)  | 13           | 4.3 (2.04–6.66)  | 0.00         | 17           | 4.8 (2.57–7.01)  | 0.94 | 0.00 |
| Antidotes                |              |              |              |              |              |              |
| Yes                      | 19           | 3.6 (2.01–5.19)  | 28           | 9.4 (6.06–12.67) | 0.00         | 18           | 5.1 (2.79–7.35)  | 0.05 | 0.28 |
| Flumazenil               | 7            | 1.3 (0.35–2.30)  | 15           | 5.0 (2.54–7.49)  | 0.11         | 8            | 2.2 (0.71–3.80)  | 0.16 | 0.29 |
| Naloxone                 | 14           | 2.6 (1.28–4.02)  | 15           | 5.0 (2.54–7.49)  | 0.89         | 8            | 2.2 (0.71–3.80)  | 0.16 | 0.71 |
| Restraint/sedation       |              |              |              |              |              |              |
| Yes                      | 37           | 7.0 (4.83–9.18)  | 21           | 7.0 (4.13–9.92)  | 0.89         | 15           | 4.2 (2.13–6.32)  | 0.37 | 0.08 |
| Destination              |              |              |              |              |              |              |
| Hospitalization          | 13           | 2.5 (1.14–3.78)  | 16           | 5.4 (2.80–7.90)  | 0.05         | 21           | 5.9 (3.46–8.37)  | 0.89 | 0.01 |
| Hospital Stay            |              |              |              |              |              |              |
| Mean (± SD)              | 10.8 (± 2.8) | 29.5 (± 12.8)   |              |              |              |              |              | 0.35 | 0.00 |
| Death                    | 1            | 0.2 (0.00–1.05)  | 0            | 0 (0.00–0.00)    | 0.77         | 2            | 0.6 (0.07–2.02)  | 0.56 | 0.35 |

SD, standard deviation; CI, confidence interval.
This scenario creates the optimal conditions a "perfect storm" next summer, which will mainly affect young people. As a result, as we concluded in a previous scientific letter,6 we have no choice but to alert the management of healthcare systems of these predictions.

Conflicts of interest

The authors declare that they do not have any conflicts of interest.

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