

Article

Intentional Poisonings and Psychiatric Comorbidity in a Hospital Emergency Department: Epidemiological Changes Before and After the COVID-19 Pandemic (2018–2022): Retrospective Study

María Alcalá-Cerrillo ¹, Mirian Santamaría-Peláez ^{2,*}, Josefa González-Santos ²,
Jerónimo J. González-Bernal ² and Ana Gómez-Martín ¹

¹ Faculty of Nursing and Occupational Therapy, University of Extremadura, Avda. de la Universidad s/n, 10003 Cáceres, Spain; malcala@unex.es (M.A.-C.); anagomez@unex.es (A.G.-M.)

² Department of Health Sciences, Faculty of Health Sciences, University of Burgos, Paseo de los Comendadores s/n, 09001 Burgos, Spain; mjgonzalez@ubu.es (J.G.-S.); jejavier@ubu.es (J.J.G.-B.)

* Correspondence: mspelaiez@ubu.es

Abstract

Background: Poisoning is a frequent cause of emergency department (ED) visits. The COVID-19 pandemic may have influenced its epidemiology and clinical profile. **Objective:** To analyze and compare the characteristics of poisonings treated in the ED before and after the COVID-19 pandemic. **Methods:** A retrospective observational study was conducted including all patients who attended for acute poisoning in a Spanish tertiary hospital from January 2018 to December 2022. Sociodemographic variables, toxic agents, clinical features, psychiatric history, intentionality, and outcomes were analyzed. **Results:** A total of 170 cases were recorded. Medicinal agents were the most frequent toxicants, followed by ethanol. After the onset of the pandemic, there was an increase in poisonings due to medicinal agents and in cases with psychiatric comorbidity, particularly intentional overdoses. Hospital admissions and ICU referrals also increased, although mortality remained low. **Conclusions:** The COVID-19 pandemic was associated with relevant changes in the epidemiology and clinical profile of poisonings treated in the ED, highlighting the growing importance of intentionality and psychiatric disorders.

Keywords: intoxication; poisoning; hospital emergency service; life-threatening; International Classification of Diseases; substance abuse



Academic Editor: Ana Adan

Received: 24 June 2025

Revised: 18 August 2025

Accepted: 13 October 2025

Published: 16 October 2025

Citation: Alcalá-Cerrillo, M.; Santamaría-Peláez, M.; González-Santos, J.; González-Bernal, J.J.; Gómez-Martín, A. Intentional Poisonings and Psychiatric Comorbidity in a Hospital Emergency Department: Epidemiological Changes Before and After the COVID-19 Pandemic (2018–2022): Retrospective Study. *Psychiatry Int.* **2025**, *6*, 127. <https://doi.org/10.3390/psychiatryint6040127>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Understanding the circumstances of emergency service attended poisonings is critical for addressing this public health concern. These cases demand immediate attention and present challenges for healthcare professionals, emphasizing the importance of comprehending their underlying factors, trends, and implications.

Epidemiological studies reveal a diversity of toxic agents, ranging from industrial chemicals to over-the-counter medications and illegal drugs. Furthermore, poisoning rates vary by age, sex, and geographical location, emphasizing the complexity of this phenomenon [1].

The underlying causes of poisonings are multiple and may include household accidents, suicide attempts, occupational exposure to toxic substances, and substance misuse.

In general, poisonings are more frequent in mid-life males, and most are of mild severity. The most commonly used toxic substance in acute poisonings is alcohol, followed by drugs of abuse and medications [1–3]. There are also variations with age, with older adults experiencing more accidental poisonings at home and due to medications, while among children, accidental poisonings are predominant [1].

Poisonings are a common reason for seeking assistance in hospital emergency services (HES), accounting for up to 1% of the total cases. The majority occur in mid-life, with a predominance in males, in public places, and with recreational intent [1–3]. Most cases are mild, with a mortality rate below 0.2%, although in severe poisoning cases, it can reach 1% [1].

Currently, it is also necessary to reference the possibility that the pandemic caused by COVID-19, along with the measures adopted by different countries to reduce the spread of the virus, such as mobility restrictions and/or home confinement [4–7], may have altered patterns and trends in poisonings due, among other factors, to the psychological effects of both the pandemic and the lockdown [8]. There are studies pointing to an increase in intentionality and the male-to-female ratio, more admissions, and longer durations, or a decrease in the average age [9–11].

The socioeconomic impact of poisonings is substantial and warrants attention. This issue imposes significant financial burdens on individuals and society as a whole. Direct costs, such as medical expenses and rehabilitation, weigh heavily on affected individuals and their families. Additionally, the healthcare system bears indirect costs associated with emergency care, hospitalization, and specialized personnel required for treatment. Moreover, the macroeconomic repercussions include the loss of labor productivity due to temporary or permanent disabilities, further exacerbating the economic impact [1].

The present research aims to describe the epidemiological and clinical characteristics of poisonings attended at the Emergency Department of the Complejo Hospitalario de Cáceres (Spain), consisting of the University Hospital of Cáceres and the San Pedro de Alcántara Hospital, from January 2018 to December 2022. Additionally, it seeks to explore the differences between the pre-COVID-19 and post-COVID-19 periods based on biological sex, age, length of stay in days, type of emergency (pediatric or adult), primary diagnostic type according to ICD-10 [12], intentionality, type of substance, other intoxications in the same episode (whether the patient had been intoxicated with more than one substance at once or not), previous psychiatric history, previous suicide attempts or self-harm, nicotine/alcohol/other substance consumption or abuse, and the type of treatment received.

Based on previous literature, we hypothesized that the COVID-19 pandemic might have influenced the epidemiological and clinical patterns of poisoning cases treated in emergency services. To test this hypothesis, we conducted a retrospective observational study analyzing hospital records from a tertiary hospital over a five-year period, which allowed for the examination of temporal trends and the assessment of possible changes associated with the pandemic.

2. Materials and Methods

2.1. Study Design and Setting

Retrospective observational study conducted on poisoning cases from 2018 to 2022, following STROBE recommendations [13]. Patient data meeting inclusion criteria sourced from San Pedro de Alcántara Hospital's medical records.

The data were collected by emergency department personnel, recorded in medical files.

2.2. Selection of Participants

The participants in the study were individuals who attended the Emergency Department of the Complejo Hospitalario de Cáceres (Spain) between January 2018 and December

2022 due to some form of poisoning. Since the data needed for this study were obtained from the Coding Service of the Complejo Hospitalario de Cáceres, it is understood that there is no need for information about the patient's medical history, as the data were handled anonymously. Thus, the study only worked with the number of daily poisonings, ensuring compliance with the Data Protection Act (LOPD). Therefore, neither the design nor the need for the patient to sign an "Informed Consent" for the study was deemed necessary. However, approval from the Research Ethics Committee of the Complejo Hospitalario de Cáceres was required and obtained. The approval was granted in the minutes No. 2 of 2023, dated 23 February, with reference Code CEIm.-105-2022.

A total of 170 patients meeting these criteria were included in the study. As inclusion criteria, the primary diagnosis of patients had to be coded according to the ICD-10 Classification in T36–T50—Poisoning by, adverse effects of, and underdosing of drugs, medications, and biological substances or in T51–T65—Toxic effects of substances chiefly nonmedicinal [12]. This group of codes covers situations such as accidental, intentional, or overdose poisoning, as well as adverse effects of medications. All patients who, even if attended by emergency services outside the hospital due to poisoning, did not enter the HES for any reason were excluded. Only cases with complete medical records were included in the study; therefore, no missing data were present for the variables analyzed.

This research followed the ethical principles outlined in the Declaration of Helsinki promulgated by the World Medical Association in 1964.

2.3. Measurements

To determine the variable "pre-COVID-19" and "post-COVID-19," all patients treated before March 11, 2020 [14], the date of the World Health Organization's declaration of the pandemic, were considered "pre-COVID-19," while those treated on or after that date were considered "post-COVID-19."

The other collected variables included the discharge service, biological sex (male, female), age (years), admission date, length of stay (days), type of emergency pediatric (younger than 18 years) or adult, classification according to the All Patients Refined—Diagnosis-Related Groups (APR-DRG) State Standard [15,16], type of substance (T36–T50—drugs, medications, and biological substances—or T51–T65—chiefly nonmedicinal origin—according to the ICD-10 Classification), primary diagnosis according to ICD-10 (T36, T37... T65), secondary diagnoses according to ICD-10, intentionality (yes or no, undetermined; extracted from the diagnosis according to ICD-10), other intoxications in the same episode, psychiatric diagnosis or history, previous self-harm or suicide attempts, nicotine/alcohol/other substance consumption or abuse, and type of treatment (medical, surgical) [12].

2.4. Analysis

Statistical analyses were performed using IBM SPSS Statistics version 25.0. The distribution of quantitative variables was assessed with the Kolmogorov–Smirnov test and confirmed to be normal ($p > 0.05$). Therefore, quantitative variables are expressed as mean $\pm$ standard deviation (SD). Frequency distributions and percentages were used for categorical variables. Group differences (pre- and post-COVID-19) were assessed using Student's *t*-test for quantitative variables and the Chi-square test for categorical variables. Statistical significance was set at $p < 0.05$. Cases with undetermined intentionality were excluded from the comparison between intentional and non-intentional poisonings. All statistical tests were two-sided.

3. Results

3.1. Characteristics of Study Subjects

The analyses were conducted with 170 patients, distributed across the years as follows: 17 treated in 2018 (10%), 29 in 2019 (17.1%), 21 in 2020 (12.4%), 58 in 2021 (34.1%), and 45 in 2022 (26.5%). Of these, 50 patients (29.4%) correspond to the pre-COVID-19 period, and 120 patients (70.6%) correspond to the post-COVID-19 period. No participants were lost, and there were no missing data.

According to the APR-GRD [15] classification, the majority of cases ($n = 150$, 88.2%) were categorized as 812—Poisoning by medicinal agents; 13 individuals (7.6%) as 816—Toxic effects of non-medicinal substances; 4 individuals (2.4%) as 951—Moderately extensive procedure unrelated to the principal diagnosis; 2 individuals (1.2%) as 950—Extensive procedure unrelated to the principal diagnosis; and finally, 1 person (0.6%) as 004—Tracheostomy with mechanical ventilation (VM) for 96+ hours with extensive ECMO-related procedure.

The distribution of the primary diagnosis coded according to the ICD-10 classification is presented in Table 1.

Table 1. Primary Diagnosis (ICD-10) (Uribe, 2018).

ICD-10 Diagnosis Frequency	Frequency	Percentage %
T38. Poisoning, adverse effect, and underdosing of hormones and their synthetic substitutes, not elsewhere classified.	4	2.4
T39. Poisoning, adverse effect, and underdosing by non-opioid analgesics, antipyretics, and antirheumatics.	20	11.8
T40. Poisoning, adverse effect, and underdosing by narcotics and psychodysleptics (hallucinogens).	9	5.3
T41. Poisoning, adverse effect, and underdosing by inhaled anesthetics.	1	0.6
T42. Poisoning, adverse effect, and underdosing by antiepileptic, hypnotic-sedative, and antiparkinsonian drugs.	56	32.9
T43. Poisoning, adverse effect, and underdosing by psychotropic drugs not elsewhere classified.	28	16.5
T44. Poisoning, adverse effect, and underdosing by drugs affecting primarily the autonomic nervous system.	1	0.6
T45. Poisoning, adverse effect, and underdosing by agents primarily affecting the systemic and hematological systems, not elsewhere classified.	14	8.2
T46. Poisoning, adverse effect, and underdosing by agents primarily affecting the cardiovascular system.	7	4.1
T47. Poisoning, adverse effect, and underdosing by agents primarily affecting the digestive system.	1	0.6
T48. Poisoning, adverse effect, and underdosing by agents primarily affecting the smooth and striated muscles and the respiratory system.	1	0.6
T50. Poisoning, adverse effect, and underdosing by diuretics, other drugs, medications, and biological substances, not elsewhere classified.	16	9.4
T51. Toxic effect of alcohol.	1	0.6
T52. Toxic effect of organic solvents.	1	0.6
T54. Toxic effect of corrosive substances.	10	5.9
Total	170	100.0

Hospital services that most frequently discharged individuals admitted for poisonings were psychiatry ($n = 71$, 41.8%), pediatrics ($n = 39$, 22.9%), internal medicine ($n = 27$, 15.9%), geriatrics ($n = 14$, 8.2%), and intensive care ($n = 8$, 4.7%).

Descriptive statistics for the remaining variables are presented in Tables 2 and 3, respectively, for the pre-COVID-19 and post-COVID-19 periods, as well as the total for 2018–2022.

Table 2. Descriptive Statistics for Quantitative Variables.

		N	Minimum	Maximum	Mean	Standard Deviation
Age (years)	Pre-COVID-19	50	0	88	33.58	26.887
	Post-COVID-19	120	0	97	45.30	27.218
	Total 2018–22	170	0	97	41.85	27.567
Hospital Stay (Days)	Pre-COVID-19	50	0	31	5.68	7.263
	Post-COVID-19	120	0	51	5.81	6.634
	Total 2018–22	170	0	51	5.77	6.803

Table 3. Frequencies and Percentages for Qualitative Variables.

		Pre-COVID-19		Post-COVID-19		Total	
		Frequency	%	Frequency	%	Frequency	%
Sex	Male	24	48.0%	50	41.7%	74	43.5%
	Female	26	28.2%	70	58.3%	96	56.5%
Emergency Type	Pediatric	18	36.0%	25	20.8%	43	25.3%
	Adult	32	64.0%	95	79.2%	127	74.7%
Treatment Type	Medical	19	98.0%	114	95.0%	163	95.9%
	Surgical	1	2.0%	6	5.0%	7	41.1%
APR_GRD	812	46	92.0%	104	86.7%	150	88.2%
	816	3	6.0%	10	8.3%	13	7.6%
	950	1	2.0%	1	0.8%	2	1.2%
	951	0	0%	4	3.3%	4	2.4%
	004	0	0%	1	0.8%	1	0.6%
Main Diagnosis Type	T36–T50	47	94.0%	111	92.5%	158	92.9%
	T51–T65	3	6.0%	9	7.5%	12	7.1%
Intent	Yes	29	58.0%	70	58.3%	99	58.2%
	No	18	36.0%	50	41.7%	68	40.0%
	Undetermined	3	6.0%	0	0%	3	1.8%
Other Intoxications	Yes	13	26.0%	13	10.8%	26	15.3%
	No	37	74.0%	107	89.2%	144	84.7%
Psychiatric History	Yes	26	52.0%	79	65.8%	105	61.8%
	No	24	48.0%	41	34.2%	65	38.2%
Previous Suicide/Self-harm	Yes	10	20.0%	14	11.7%	24	14.1%
	No	40	80.0%	106	88.3%	146	85.9%
Alcohol	Yes	16	32.0%	22	18.3%	38	22.4%
	No	34	68.0%	98	81.7%	132	77.6%
Nicotine	Yes	8	16.0%	27	22.5%	35	20.6%
	No	42	84.0%	93	77.5%	135	79.4%
Other Substance	Yes	7	14.0%	22	18.3%	29	17.1%
	No	43	86.0%	98	81.7%	141	82.9%

3.2. Main Results

The average age pre-COVID-19 was 33.58 years (SD = 26.88), while the post-COVID-19 average age was 45.30 years (SD = 27.21). Additionally, the mean length of stay pre-COVID-19 was 5.68 days (SD = 7.26), and post-COVID-19 was 5.81 days (SD = 6.63). There was a statistically significant difference in age ($t(168) = -2.56, p = 0.011$) with higher average age in the post-COVID-19 group. However, there were no statistically significant differences in length of stay ($t(168) = -0.112, p = 0.911$) between the pre and post-COVID-19 groups.

For the rest of the qualitative variables, a Chi-square analysis was performed. In the case of the “intentionality” variable, patients with undetermined intentionality were excluded. Table 4 shows that there are only significant differences between the pre-COVID-19 and post-COVID-19 periods for the variable “other intoxications in the same episode,” with data shown in Table 5.

Table 4. Pre-COVID-19–Post-COVID-19 Differences. Chi-square.

	Pre–Post COVID-19	
	Value	Two-Tailed Exact Significance (Fisher’s Exact Test)
Sex	0.347	0.499
Emergency Type (pediatric/adult)	3.531	0.052
Intent	0.050	0.729
Other Intoxications	5.151	0.018
Psychiatric Diagnosis	2.304	0.119
Previous Suicide/Self-harm	1.393	0.225
Alcohol	3.052	0.068
Nicotine	0.558	0.409
Other substance	0.212	0.655

Table 5. Cross-tables. Pre–post COVID-19—Other intoxications.

			Other Intoxications in the Same Episode		Total
			Si	No	
Pre–post COVID- 19	Pre-COVID- 19	Count	13	37	50
		Expected count	7.6	42.4	50.0
		% within Pre–post COVID-19	26.0%	74.0%	100.0%
	Post- COVID-19	Count	13	107	120
		Expected count	18.4	101.6	120.0
		% within Pre–post COVID-19	10.8%	89.2%	100.0%
	Total	Count	26	144	170
		Expected count	26.0	144.0	170.0
		% within Pre–post COVID-19	15.3%	84.7%	100.0%

It was not possible to conduct this analysis for the variable “type of primary diagnosis” (T36–T50 or T51–T65, according to ICD-10 Classification [12]) since in the T51–T65 group, there were only 3 cases in pre-COVID-19 and 9 cases in post-COVID-19. It was also not possible to analyze the “type of treatment” variable as, in the pre-COVID-19 period, only 1 case with surgical intervention was recorded, and in the post-COVID-19 period, there were 6 cases with surgical intervention.

4. Discussion

This study, conducted between January 2018 and December 2022, examined 170 cases of poisoning, dividing them into pre and post-COVID-19 periods; 50 patients fall within the pre-COVID-19 period, while 120 belong to the post-COVID-19 period.

In our series, poisonings were most commonly due to medicinal agents (88.2%), treated predominantly by the psychiatry department (41.8%), with medical treatment being the main therapeutic approach (95.9%). The majority of cases involved adult patients (74.7%), with a predominance of female patients (56.5%), intentional poisonings (58.2%), and individuals with a psychiatric history (61.8%). A significant increase in the average

age was observed in the post-COVID-19 period, and the proportion of multi-substance intoxications was higher compared to the pre-COVID-19 period.

In our study, 61.8% of patients had a documented psychiatric history and 14.1% had previous suicide or self-harm attempts (Table 3). These proportions indicate a substantial underlying psychiatric burden among poisoning cases and support the interpretation that many intentional events are linked to pre-existing mental health conditions rather than being exclusively pandemic-driven. Although a post-COVID-19 increase in multi-substance intoxications was observed, we did not perform a specific analysis stratifying multi-substance use or particular pharmacological agents by psychiatric diagnosis. Given that medicinal agents were coded at ICD-10 group level, detailed characterization of drug classes was not feasible in this study. Clinically, these findings underscore the relevance of systematic mental-health assessment, safety planning, and follow-up for at-risk patients in emergency settings.

Understanding the characteristics, underlying factors, trends, and implications of intoxications in emergency services is relevant for clinical practice to provide appropriate and early care for each patient, given the importance of immediate attention [1,17]. The importance of epidemiological studies lies in the dynamic nature of poisonings, the constant emergence and higher accessibility of new drugs, medications, and products. Demographic shifts within populations, including cultural variations, access to services, aging, and immigration, contribute to changes in poisoning characteristics over time. Additionally, variations may exist within geographic areas [1] and even within the hospital's location and the time of year [3].

Previous multicenter studies, such as SEMESTOX and HISPATOX [1], as well as other research [3,18,19], reported a higher prevalence of poisoning cases among males, typically presenting with mild severity. In contrast, our study found a greater proportion of female patients (56.5%), suggesting possible shifts in substance use patterns, mental health trends, or healthcare-seeking behaviors over time. These findings may reflect evolving societal factors influencing the epidemiology of poisonings and underscore the need for continuous monitoring of demographic changes.

Regarding age, our results align with previous literature describing a youthful profile, with reported mean ages ranging from 34 to 50 years [1,19,20]. Specifically, we found an average age of 41.85 years across the entire study period. However, it is noteworthy that other studies have also identified a predominance of female patients (up to 55%) [20] and a high proportion of intentional poisonings (64.2%) [19,20], findings consistent with our sample. In particular, the study by Getie and Belayneh in Ethiopia [20] also reported a majority of female cases and intentional poisonings, despite the geographical and sociodemographic differences, supporting the broader applicability of these patterns.

In our study, the substances most frequently implicated in poisonings were pharmacological, medicinal, or biological agents. This finding differs from the general trend described in the literature, where alcohol is often identified as the most common agent involved in acute poisonings, followed by drugs of abuse and medications [1,21]. Similarly, a retrospective study conducted in Asturias (Spain) also reported alcohol and benzodiazepines as the most frequently used substances, with a predominance of male patients and intentional poisonings accounting for 16.8% of cases [2]. However, Baeza, Muñoz-Ortega, and Vela [3], in their analysis of three hospitals in southeast Spain, noted that while alcohol was the predominant toxin among men, benzodiazepines were the most common among women, particularly in cases of intentional self-harm. The higher prevalence of women in our sample may thus partially explain the predominance of medicinal agents and the high proportion of intentional poisonings observed.

In the case of pediatric poisonings, research indicates that the most frequent occurrences in young children result from the ingestion [17,18,22–25] of a single substance [17], often household products, followed by medications [18,21–23,26], or vice versa [25], typically involving an accidental mechanism [18,21–26]. On the other hand, intentional poisoning [17,26] and the ingestion of pharmaceutical substances [17] or alcohol [26] are more common among teenagers. Thus, as age increases, intentional poisonings become more prevalent compared to accidental poisonings [27]. However, considerable epidemiological differences in acute poisonings exist among children in different countries and regions worldwide [24].

In our sample, pediatric cases represented 25.3% of the total poisonings, with most involving single-substance ingestions. Although the small number of pediatric cases limits definitive conclusions, our findings are consistent with the literature describing a predominance of accidental poisonings in younger children and a greater intentional component among adolescents. These results highlight the need for age-specific prevention strategies in pediatric populations.

In our study, no differences were observed between the pre-COVID-19 and post-COVID-19 periods across most variables analyzed, except for a significant increase in the number of multi-substance intoxications post-pandemic. Other epidemiological studies have reported broader changes associated with the COVID-19 pandemic. For instance, Puiguriguer et al. [10] observed a decrease in the overall number of poisonings during lockdown periods, but an increase in the male-to-female ratio, the average age of patients, and the incidence of suicidal poisonings. In the pediatric population, Azkunaga et al. [11] described a significant rise in suicidal poisonings during the pandemic years compared to previous periods. Additionally, Sánchez Gómez et al. [28] found that during the COVID-19 state of alarm in Spain, the prevalence of pediatric poisonings increased compared to 2019, with a notable shift toward intentional exposures. Although our data did not reveal significant differences in sex distribution or overall intentionality, the observed increase in multi-substance poisonings post-COVID-19 may reflect a more complex clinical profile among intoxicated patients, possibly linked to the psychological and social impacts of the pandemic.

The observed increase in multi-substance intoxications after the COVID-19 pandemic may reflect a more complex clinical profile among affected patients. Possible explanations include higher impulsivity during suicide attempts, the coexistence of multiple psychiatric comorbidities, or evolving patterns of medication and substance use during and after the pandemic. Although our dataset did not allow for stratified analyses by psychiatric diagnosis or by specific pharmacological groups, these hypotheses align with prior literature that has highlighted the intersection between mental health vulnerabilities and polysubstance use. Further studies should investigate whether this trend is sustained over time, explore the psychosocial and clinical correlates of multi-substance intoxications, and assess its implications for both acute management in emergency settings and long-term psychiatric follow-up.

In addition to the changes observed in poisoning patterns, previous studies have highlighted that the COVID-19 pandemic affected the quality of emergency medical services and medical interventions in different healthcare systems [29,30].

Our research reveals significant differences in cases of poisoning involving more than one substance in the same episode. We have not found publications that either support or refute this relationship; however, it could be that, given the majority of suicidal poisonings in the sample, there may be some kind of correlation. Nevertheless, we cannot assert this, though it would be an interesting hypothesis to explore in future research.

This study has several limitations that should be acknowledged. First, although anonymized data complied with ethical requirements, we did not have access to patients' full medical records. Therefore, detailed psychiatric histories (e.g., previous diagnoses of depression, personality disorders, or chronic psychiatric illness) could not be analyzed. This restricts the ability to determine whether the observed increase in intentional poisonings after the COVID-19 pandemic was directly influenced by the pandemic or primarily associated with pre-existing psychiatric conditions. Consequently, our conclusions regarding the pandemic's impact on suicidal poisonings should be interpreted with caution. Second, its retrospective design, relying on hospital medical records, may have led to underreporting of asymptomatic or mild cases that did not require hospitalization, such as low-severity poisonings. Second, although data coding followed standardized classifications (ICD-10 and APR-GRD), there is a potential risk of coding errors, misclassification, or omissions that could affect data accuracy. Third, the absence of toxicological confirmation (e.g., laboratory confirmation of substances involved) limits the causal attribution of the agents implicated in each case.

Additionally, the study's findings are confined to a single hospital located in a specific geographic region of Spain, which may introduce selection bias and limit the generalizability of the results. Potential biases in data collection should also be considered, including healthcare access disparities (where more severe cases requiring hospitalization are over-represented) and cultural or regulatory factors (such as regional differences in substance availability or stigma around self-harm behaviors). Furthermore, it should be considered that our study was conducted in a single tertiary hospital (Hospital San Pedro de Alc ntara, C ceres), which mainly serves both urban and rural populations. This context may limit the generalizability of the findings to other regions with different demographic, cultural, or healthcare system characteristics. Nevertheless, the observed patterns provide relevant insights into poisoning epidemiology within this setting and may be comparable to similar hospitals in Spain and Southern Europe.

Another limitation is that medicinal agents were recorded using ICD-10 categories (T36–T50) without specifying the exact substances or drug classes. As a result, we could not differentiate whether poisonings were primarily due to prescription psychotropics, analgesics, or over-the-counter medications. This restricts the interpretation of the motivations and underlying causes of the poisonings.

These limitations highlight the need for future multicenter and prospective studies incorporating clinical, toxicological, and forensic data to provide a more comprehensive understanding of poisoning trends and outcomes.

Based on the findings and limitations of this study, several directions for future research are proposed. First, conducting prospective, multicenter studies would help to improve the generalizability of results and minimize biases related to geographic and healthcare system differences. Second, a more detailed investigation into multi-substance poisonings, particularly in intentional cases, is warranted to understand the most common combinations, their clinical implications, and associated psychosocial factors. Additionally, future research should explore sex differences in poisoning patterns, with special attention to the role of mental health factors and medication use. In pediatric populations, studies focusing on prevention strategies, the influence of social media, and early detection of suicidal behaviors would be highly valuable. Expanding toxicovigilance systems and integrating novel technologies, such as rapid toxicological testing and AI-based monitoring tools, could also enhance the early identification of emerging poisoning trends.

The findings of this study have practical implications for healthcare professionals and policymakers. In clinical practice, the predominance of intentional poisonings, especially among adult female patients, highlights the need for integrating mental health screening

and psychiatric evaluation protocols in emergency departments for poisoning cases. Efforts to promote safe medication practices, including secure storage and appropriate prescription monitoring, are particularly important for high-risk groups.

In the field of public health, the consistent pattern of medicinal agents involved in poisonings supports the need for preventive strategies, such as community education on safe medication use and targeted awareness campaigns addressing vulnerable populations. Furthermore, the increase in multi-substance poisonings observed post-COVID-19 underlines the importance of toxicovigilance systems capable of early detection of emerging trends. Coordinated actions between clinical services and public health programs are essential to improve the prevention and management of poisoning incidents.

5. Conclusions

The strengths of this study lie in the clinical utility of epidemiological analyses based on hospital records, using widely recognized classifications such as ICD-10 [12] and APR-GRD [15]. The use of standardized terminology facilitates reproducibility and provides clinically relevant information in a uniform language.

In conclusion, most poisonings treated in the HES involved adult female patients, with cases primarily managed by the psychiatry department and related to the intentional ingestion of medicinal substances. Upon analysis, no major differences were observed between the pre- and post-COVID-19 periods across most variables; however, a significant increase in the number of multi-substance intoxications was detected post-pandemic. These findings suggest a relatively stable epidemiological pattern over time, with some emerging trends that warrant ongoing surveillance.

Author Contributions: M.A.-C. and J.J.G.-B. conceived the study and designed the study. J.G.-S., M.S.-P. and A.G.-M. supervised the conduct of the study and data collection. M.A.-C. and A.G.-M. undertook recruitment of participating centers and patients and managed the data, including quality control. J.G.-S., J.J.G.-B. and M.S.-P. provided statistical advice on study design and organized, cleaned and analyzed the data. M.A.-C., M.S.-P. and A.G.-M. drafted the manuscript, and all authors contributed substantially to its revision and final version of the manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee of the Complejo Hospitalario de Cáceres (protocol code 105-2022, approved on 23 February 2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on reasonable request from the corresponding authors.

Acknowledgments: The authors express their gratitude to Belén Moralejo Benítez for her valuable assistance in coding and preparing anonymous data for the development of this work.

Conflicts of Interest: Authors declare no conflicts of interest.

References

1. Xarau, S.N. *Toxicología Clínica: Bases Para el Diagnóstico y el Tratamiento de las Intoxicaciones en Servicios de Urgencias, Áreas de Vigilancia Intensiva y Unidades de Toxicología*; Elsevier: Amsterdam, The Netherlands, 2019.
2. Fernández-Ibáñez, A.; Ugalde-Herrá, R.; Rodríguez-Getino, J.Á.; Casas, J.B.G.; Díaz-Suárez, J.C. Epidemiología de las intoxicaciones agudas por sustancias de abuso en Urgencias. Estudio descriptivo en el área IV de Asturias. *Adicciones* **2021**, *33*, 43–52. [[CrossRef](#)]

3. Baeza, M.; Muñoz-Ortega, A.; Vela, N. Prevalencia de las intoxicaciones agudas asistidas en 3 hospitales del sureste español. *Rev. Clin. Esp.* **2020**, *220*, 236–243. [CrossRef]
4. López-Bueno, R.; Calatayud, J.; Casaña, J.; Casajús, J.A.; Smith, L.; Tully, M.A.; Andersen, L.L.; López-Sánchez, G.F. COVID-19 confinement and health risk behaviors in Spain. *Front Psychol.* **2020**, *11*, 1426. [CrossRef] [PubMed]
5. Hawryluck, L.; Gold, W.L.; Robinson, S.; Pogorski, S.; Galea, S.; Styra, R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg. Infect. Dis.* **2004**, *10*, 1206. [CrossRef] [PubMed]
6. Xiao, H.; Zhang, Y.; Kong, D.; Li, S.; Yang, N. Social capital and sleep quality in individuals who self-isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. *Med. Sci. Monit.* **2020**, *26*, e923921. [CrossRef] [PubMed]
7. de Gatta Sánchez, D.F. Real Decreto 463/2020, de 14 de marzo, por el que se declara el estado de alarma para la gestión de la situación de crisis sanitaria ocasionada por el covid-19 y sus prórrogas. *ALS Ars. Iuris Salmant.* **2020**, *8*, 192–199.
8. Rodríguez-Fernández, P.; González-Santos, J.; Santamaria-Peláez, M.; Soto-Cámara, R.; Sánchez-González, E.; González-Bernal, J.J. Psychological effects of home confinement and social distancing derived from COVID-19 in the general population—A systematic review. *Int. J. Environ. Res. Public Health* **2021**, *18*, 6528. [CrossRef]
9. Puiguriguer Ferrando, J.; Salgado-García, E.; Nogué-Xarau, S. Intoxicaciones atendidas en urgencias durante el confinamiento por la pandemia del COVID-19. *Emergencias* **2020**, *32*, 300–301.
10. Caballero-Bermejo, A.F.; Ortega-Pérez, J.; Frontera-Juan, G.; Homar-Amengual, C.; Barceló-Martín, B.; Puiguriguer-Ferrando, J. Intoxicaciones agudas atendidas en un servicio de urgencias: De la prepandemia a la nueva normalidad. *Rev. Clin. Esp.* **2022**, *222*, 406–411. [CrossRef]
11. Azkunaga, B.; Echarte, P.; Zumalde, A.; Mintegi, S. Incremento de las intoxicaciones con fin suicida en los servicios de urgencias en España durante la pandemia COVID-19. *An. Pediatr.* **2023**, *98*, 67–69. [CrossRef]
12. Ministerio de Sanidad, Servicios Sociales e Igualdad. *Clasificación Internacional de Enfermedades—10ª Revisión Modificación Clínica; CIE-10*; Imprenta Nacional de la Agencia Estatal Boletín Oficial del Estado: Madrid, Spain, 2018.
13. Vandembroucke, J.P.; Von Elm, E.; Altman, D.G.; Gøtzsche, P.C.; Mulrow, C.D.; Pocock, S.J.; Poole, C.; Schlesselman, J.J.; Egger, M. Mejorar la comunicación de estudios observacionales en epidemiología (STROBE): Explicación y elaboración. *Gac Sanit.* **2009**, *23*, 158e1–158e28. [CrossRef] [PubMed]
14. World Health Organization. *Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV)*; World Health Organization: Geneva, Switzerland, 2020.
15. Rivero Cuadrado, A.; Sendino García, M.M.; Cózar Ruiz, R.; Pascual de la Torre, M.; García Rey, J.; García Redondo, C. *Análisis y Desarrollo de los GDR en el Sistema Nacional de Salud*; Ministerio de Sanidad y Consumo: Madrid, Spain, 1999; p. 70.
16. Ministerio de Sanidad, Consumo y Bienestar Social. Registro de Altas de los Hospitales Generales del Sistema Nacional de Salud—CMBD—Norma Estatal. 2020. Available online: <https://www.sanidad.gob.es/estadEstudios/estadisticas/cmbd.htm> (accessed on 13 December 2024).
17. Lee, J.; Fan, N.C.; Yao, T.C.; Hsia, S.H.; Lee, E.P.; Huang, J.L.; Wu, H.P. Clinical spectrum of acute poisoning in children admitted to the pediatric emergency department. *Pediatr. Neonatol.* **2019**, *60*, 59–67. [CrossRef] [PubMed]
18. Gokalp, G. Evaluation of poisoning cases admitted to pediatric emergency department. *Int. J. Pediatr. Adolesc. Med.* **2019**, *6*, 109–114. [CrossRef] [PubMed]
19. Kim, W.; Kim, K.H.; Shin, D.W.; Park, J.; Kim, H.; Jeon, W.; Park, J.-M.; Kim, J.-E.; Kim, H. Characteristics of Korean poisoning patients: Retrospective analysis by national emergency department information system. *J. Korean Soc. Clin. Toxicol.* **2019**, *17*, 108–117. [CrossRef]
20. Getie, A.; Belayneh, Y.M. A retrospective study of acute poisoning cases and their management at emergency department of Dessie Referral Hospital, Northeast Ethiopia. *Drug Health Patient Saf.* **2020**, *12*, 41–48. [CrossRef]
21. Grupo de Trabajo de Intoxicaciones Sociedad Española de Urgencias de Pediatría. Cambios epidemiológicos en las intoxicaciones atendidas en los servicios de urgencias pediátricos españoles entre 2001 y 2010: Incremento de las intoxicaciones etílicas. *Emergencias* **2012**, *24*, 376–379.
22. Tobaiqy, M.; Asiri, B.A.; Sholan, A.H.; Alzahrani, Y.A.; Alkathiri, A.A.; Mahha, A.M.; Alzahrani, S.S.; MacLure, K. Frequency and management of acute poisoning among children attending an emergency department in Saudi Arabia. *Pharmacy* **2020**, *8*, 189. [CrossRef]
23. Vilaça, L.; Volpe, F.M.; Ladeira, R.M. Accidental poisoning in children and adolescents admitted to a referral toxicology department of a Brazilian emergency hospital. *Rev. Paul. Pediatr.* **2019**, *38*, e2018096. [CrossRef]
24. Mintegi, S.; Azkunaga, B.; Prego, J.; Qureshi, N.; Dalziel, S.R.; Arana-Arri, E.; Acedo, Y.; Martínez-Indart, L.; Urkaregi, A.; Salmon, N.; et al. International epidemiological differences in acute poisonings in pediatric emergency departments. *Pediatr. Emerg. Care* **2019**, *35*, 50–57. [CrossRef]
25. Azkunaga, B.; Mintegi, S.; Salmón, N.; Acedo, Y.; Del Arco, L. Intoxicaciones en menores de 7 años en España. Aspectos de mejora en la prevención y tratamiento. In *Anales de Pediatría*; Elsevier: Amsterdam, The Netherlands, 2013; pp. 355–360.

26. Azkunaga, B.; Mintegi, S.; Bizkarra, I.; Fernández, J. Emergencies IWG of the SS of P. Toxicology surveillance system of the Spanish Society of Paediatric Emergencies: First-year analysis. *Eur. J. Emerg. Med.* **2011**, *18*, 285–287. [[CrossRef](#)]
27. Kline, J.N.; Badolato, G.M.; Goyal, M.K. Trends in pediatric poisoning-related emergency department visits: 2001–2011. *Pediatr. Emerg. Care* **2021**, *37*, e7–e12. [[CrossRef](#)]
28. Fernández-Lázaro, J.C.; Moya-Gómez, I.; Trenchs-Sainz de la Maza, V.; Castany-Capdevila, E.; Luaces-Cubells, C.; Martínez-Sánchez, L. Efecto del confinamiento en las intoxicaciones pediátricas. *Emergencias* **2022**, *34*, 75–77.
29. Leszczyński, P.K.; Sobolewska, P.; Muraczyńska, B.; Gryz, P.; Kwapisz, A. Impact of COVID-19 Pandemic on Quality of Health Services Provided by Emergency Medical Services and Emergency Departments in the Opinion of Patients: Pilot Study. *Int. J. Environ. Res. Public Health* **2022**, *19*, 1232. [[CrossRef](#)]
30. Dudziński, Ł.; Glinka, M.; Glinka, P. Medical interventions of the Fire Service during the COVID-19 pandemic in Poland. *Crit. Care Innovat.* **2021**, *4*, 23–31. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.