

PATTERN OF PSYCHOTROPICS' INTOXICATION BEFORE AND DURING COVID-19 PANDEMIC: COMPARATIVE STUDY IN EGYPT

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ABSTRACT

Background: Psychotropic drugs are significantly used in acute poisoning. Coronavirus disease 2019 (COVID-19) pandemic influences health care facilities world-wide, including the cases of hospital admission due to toxic exposure. **Aim of the work:** was to identify the acute psychotropics intoxication pattern in patients presented to National Environmental and Clinical Toxicology and Research Center (NECTR), Egypt, prior to and throughout COVID 19 pandemic. **Patients and methods:** This comparative retrospective study included 623 cases who were admitted at NECTR during the period of the work which is 1 year (from February 2019 to January 2020) prior to pandemic and 1 year (from February 2022 to January 2023) during pandemic. Cases were analyzed regarding demographic data, history of psychiatric disorder and psychotropics medications, type of drug, manner of intoxication, drug accessibility, delay time of presentation, the severity of poisoning using poisoning severity score (PSS), admission status, duration of hospital stay and outcome. **Results:** Cases presented throughout the pandemic (n=286, 45.9%) were decreased in comparison to before the pandemic (n=337, 54.1%) with female predominance in both periods. There was an increase in the suicidal manner (97.2%), the acute toxicity with antipsychotics (64.7%), sedative hypnotics (5.9%) and anxiolytics (3.1%) during pandemic. The most common involved drugs during the two periods were non-prescribed (76.6%) in the form of antipsychotics followed by mood stabilizers. **Conclusion:** Severe and fatal poisoning severity score (PSS) were associated with antipsychotics class, early adulthood age group, males before pandemic and females during the pandemic period, non-prescribed psychotropic drugs, and ICU admission. **Keywords:** COVID-19 Pandemic, Intoxication, Psychotropics, Egypt, Poisoning Severity Score (PSS).

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INTRODUCTION

Psychotropic drugs including anxiolytics, hypnotics, mood stabilizers, antidepressants, and antipsychotics are globally used and frequently prescribed to treat a range of mental and behavioral disorders (Hirano, 2020; Mazzilli et al., 2021).

Despite that psychotropic drugs are known to be effective in treating psychiatric conditions, there is also evidence that there is a link between higher prescribing rates and greater use in deliberate drug overdose (Corcoran et al., 2013).

Furthermore, the most frequent way that people attempt suicide is by poisoning, and antipsychotics, antidepressants, and benzodiazepines are among the psychotropic medications that are frequently utilized for this purpose (Mowry et al., 2016).

As per the National Poison Data System's annual report for 2020, antipsychotics, antidepressants, and sedative hypnotics are among the top five substance classes most involved in subjects presented to poison control centers (Gummin et al., 2021).

In Egypt, studies revealed that therapeutic centrally acting drugs including psychotropics were the commonest drugs involved in acute toxic exposure (Elmadah, 2012; Abdelhamid, 2021).

Coronavirus disease 2019 (COVID-19) pandemic caused heightened levels of anxiety and distress, as people encountered social isolation, fear of being infected, job and financial insecurities, which may lead to psychotropic medications' misuse (de Oliveira Costa et al., 2022).

THE AIM OF THE WORK

Since acute poisoning patients are typically emergency cases, inappropriate management or delayed transfer could cause serious consequences. So, the present work aims to investigate the acute psychotropics' intoxication pattern in patients presented to National Environmental and Clinical Toxicology and Research Center (NECTR), Egypt, prior to and throughout COVID-19 pandemic.

PATIENTS AND METHODS

This comparative retrospective study included 623 cases, with acute psychotropic drugs toxicity, who were presented to NECTR, Egypt, for 2 years divided as follows; 1 year (from February 2019 to January 2020) prior to pandemic and 1 year (from February 2022 to January 2023) throughout pandemic.

Cases were analyzed regarding a data collection sheet, adopted from *Aboubakr et al. (2023)*, which included:

- Demographic data (age, sex, residence, marital status, education level and occupation)
- History of psychiatric disorder and psychotropics' medications
- Type of drug
- Manner of intoxication
- Drug accessibility
- Delay time of presentation
- Severity of poisoning using poisoning severity score (PSS)
- Admission status
- Duration of hospital stay
- Outcome

Ethical Consideration

Data were collected and analyzed after obtaining approval from NECTR administration. The ethical committee of Cairo University's Faculty of Medicine has approved the study with reference number *MS-130-2022*.

Sample size

Based on evidence from previous similar study and by considering the proportion of Antipsychotics intoxication cases after covid-19 pandemic as a primary outcome. Epi-calc 2000 was used to calculate the sample size of this comparative study.

The sample size was 223 participants. Considering drop-outs rate of 10%, therefore the final sample size was 245 participants.

Statistical Analysis:

Data were coded and entered using the statistical package for the Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA). Data was summarized using frequency (count) and relative frequency (percentage) for categorical data. For comparing categorical data, Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5 (*Chan, 2003*). P-values less than 0.05 were considered statistically significant.

RESULTS

Demographic and exposure characteristics before and during COVID-19 pandemic

According to **Table 1**, it was found that 337 (54.1%) cases were presented to NECTR prior to pandemic period, and 286 (45.9%) cases were presented to NECTR during pandemic period. Cases in early adulthood period (58.5% and 70.3%), females (66.2% and 75.5%), urban population (82.8% and 88.8%), single (34.4% and 41.6%), educated (81.6% and 97.9%), and non-working (82.5% and 74.5%), were statistically predominant in both periods, prior to and throughout the pandemic, respectively.

Assessment of psychotropic drugs' intoxicated cases before and during COVID-19 pandemic

- History of psychiatric disorder and psychotropic medications

Most cases were without a history of psychiatric disorder (95.5% and 87.4%) or psychotropic medications (93.8% and 85%), prior to and throughout COVID-19, respectively (**Table 2**).

- Type of the psychotropic drug

As shown in **table (2)**, a significant difference ($p < 0.001$) was found between the distributive pattern of psychotropic drugs toxicity was noted during the two studied periods where the most common drug toxicity was for antipsychotics, followed by mood stabilizers and then by antidepressants in the two periods, with an increase in percentage of antipsychotics (64.7%), sedative hypnotics (5.9%) and anxiolytics toxicities (3.1%) and decrease in antidepressants (11.5%), mood

stabilizers (12.6%) and combined psychotropic drugs toxicities (2.1%) during pandemic.

- Manner of intoxication

Table (2) shows a significant difference as suicidal toxicity contributed to the majority of cases in the two periods (77.4% and 97.2%), while accidental toxicity represented (22.6% and 2.8%) prior to and throughout the pandemic, respectively.

- Drug accessibility

A significant difference was found as toxicity with non-prescribed drugs was predominant in both periods and its percentage decreased during pandemic period (76.6%), while the percentage of toxicity with prescribed drugs increased during pandemic (23.4%), as shown in **table (2)**.

- Delay time of presentation

Most cases were represented to NECTR within 2 to 6 hours (51.9% and 67.1%), followed by cases who represented in less than 2 hours of toxicity (21.1% and 19.9%), prior to and throughout the pandemic, respectively, with a significant difference between the two studied periods (**Table 2**).

- Poisoning severity score (PSS)

According to **table (2)**, a significant difference was noted between the two periods as most cases represented with minor severity (49.0% and 53.8%) followed by moderate severity (26.4% and 31.5%) then by cases with no severity (17.8% and 11.2%), then by cases with severe presentation (6.2% and 2.8%) and finally fatal cases (0.6% and 0.7%), prior to and throughout the pandemic, respectively.

- Outcome

Most cases were improved and discharged after completing their treatment course (65.3% and 85.3%), followed by the cases who were discharged on their own responsibility (32.3% and 13.6%), prior to

and throughout the pandemic, respectively, with a significant difference between the two studied periods, as shown in **table (2)**.

Relation between PSS and type of psychotropic drugs

Table (3) shows antipsychotics were involved in majority of cases with none (48.3% and 50%), minor (54.5% and 62.3%), moderate (66.3% and 73.3%), severe (52.4% and 75%) and fatal (50 % and 50%) PSS grade with statistically significant difference between prior to and throughout the pandemic, respectively.

Relation between PSS, admission status and duration of hospital stay

A statistically significant difference was noted in **table (4)**, as cases admitted to ward contributed for majority of cases with none, minor, moderate and severe PSS grades before pandemic, and for minor, moderate PSS grades after pandemic, while observation for few hours and, ICU admission contributed for majority of cases with none, and severe PSS grade after pandemic, respectively. ICU admission contributed equally to the fatal PSS grade in both periods.

Duration of hospital stay of < 24 hours contributed for majority of cases with none PSS grade, whereas duration of hospital stay of 24-72 hours contributed for majority of cases with minor and moderate PSS grade in both periods. Duration of hospital stay of >72 hours contributed equally to the fatal PSS grade in both periods.

Relation between PSS and outcome

Improved and discharged cases followed by those discharged on their own responsibility contributed for majority of cases with none, minor, moderate and severe PSS grades in both periods with a difference between prior to and throughout the pandemic that is statistically significant, as shown in **table (5)**.

Table (1): Distribution of demographic and exposure characteristics among the presented sample in the two studied periods.

		Before COVID-19		During COVID-19		P value
		Count	%	Count	%	
Age (years)	Pediatric <12	68	20.2%	3	1.0%	< 0.001*
	Adolescents 12 - < 18	48	14.2%	52	18.2%	
	Early adulthood 18 - <40	197	58.5%	201	70.3%	
	Middle age 40 - < 65	24	7.1%	27	9.4%	
	Old age ≥ 65	0	0.0%	3	1.0%	
Sex	Male	114	33.8%	70	24.5%	0.011*
	Female	223	66.2%	216	75.5%	
Residence	Urban	279	82.8%	254	88.8%	0.033*
	Rural	58	17.2%	32	11.2%	
Marital status	Before the age of marriage	112	33.2%	50	17.5%	< 0.001*
	Single	116	34.4%	119	41.6%	
	Married	100	29.7%	107	37.4%	
	Divorced	5	1.5%	7	2.4%	
	Widow	4	1.2%	3	1.0%	
Education level	Pre education level	53	15.7%	2	0.7%	< 0.001*
	Not educated	9	2.7%	4	1.4%	
	Educated	275	81.6%	280	97.9%	
Occupation	Non-working	278	82.5%	213	74.5%	0.049*
	Mental	27	8.0%	35	12.2%	
	physical	32	9.5%	38	13.3%	

*P is significant if < 0.05.

Table (2): Distribution of psychiatric, psychotropic medications history, type of psychotropic drugs, manner of intoxication, drug accessibility, and delay time of presentation, PSS and outcome among the presented sample in the two studied periods.

		Before COVID-19		During COVID-19		P value
		Count	%	Count	%	
Psychiatric history	Yes	15	4.5%	36	12.6%	< 0.001*
	No	322	95.5%	250	87.4%	
History of psychotropic medications	Yes	21	6.2%	43	15.0%	< 0.001*
	No	316	93.8%	243	85.0%	
Type of psychotropic	antipsychotics	190	56.4%	185	64.7%	< 0.001*
	antidepressants	53	15.7%	33	11.5%	
	mood stabilizer	70	20.8%	36	12.6%	
	sedative hypnotic	4	1.2%	17	5.9%	
	Anxiolytic	7	2.1%	9	3.1%	
	combined	13	3.9%	6	2.1%	
Manner of intoxication	accidental	76	22.6%	8	2.8%	< 0.001*
	suicidal	261	77.4%	278	97.2%	
Drug accessibility	prescribed	56	16.6%	67	23.4%	0.033*
	non prescribed	281	83.4%	219	76.6%	
Delay time of presentation (hours)	unknown	45	13.4%	3	1.0%	< 0.001*
	< 2 hours	71	21.1%	57	19.9%	
	2 -6 hours	175	51.9%	192	67.1%	
	> 6 hours	46	13.6%	34	11.9%	
Poisoning Severity Score (PSS)	None	60	17.8%	32	11.2%	0.023*
	Minor	165	49.0%	154	53.8%	
	moderate	89	26.4%	90	31.5%	
	Severe	21	6.2%	8	2.8%	
	Fatal	2	0.6%	2	0.7%	
Outcome	Improved and discharge	220	65.3%	244	85.3%	< 0.001*
	Discharged on owns responsibility	109	32.3%	39	13.6%	
	Referred	6	1.8%	1	0.3%	
	Died	2	0.6%	2	0.7%	

*P is significant if < 0.05.

Table (3): Relation between PSS and type of psychotropic drugs before and during COVID 19 pandemic.

			Before COVID-19					During COVID-19						
			Poisoning Severity Score (PSS)					Poisoning Severity Score (PSS)						
			None	Minor	Moderate	Severe	Fatal	P value	None	Minor	Moderate	Severe	Fatal	P value
Type of drug	Antipsychotic	C	29	90	59	11	1	0.042*	16	96	66	6	1	<0.001*
		%	48.3%	54.5%	66.3%	52.4%	50%		50%	62.3%	73.3%	75%	50%	
	Antidepressant	C	16	22	11	4	0		4	21	7	0	1	
		%	26.7%	13.3%	12.4%	19%	0%		12.5%	13.6%	7.8%	0%	50%	
	Mood stabilizer	C	9	45	13	3	0		1	24	9	2	0	
		%	15%	27.3%	14.6%	14.3%	0%		3.1%	15.6%	10%	25%	0%	
	Sedative hypnotic	C	2	1	1	0	0		10	5	2	0	0	
		%	3.3%	0.6%	1.1%	0%	0%		31.3%	3.2%	2.2%	0%	0%	
	Anxiolytic	C	1	3	2	1	0		0	7	2	0	0	
		%	1.7%	1.8%	2.2%	4.8%	0%		0%	4.5%	2.2%	0%	0%	
	Combined	C	3	4	3	2	1		1	1	4	0	0	
		%	5%	2.4%	3.4%	9.5%	50%		3.1%	0.6%	4.4%	0%	0%	

*P is significant if < 0.05.

Table (4): Relation between PSS, admission status and duration of hospital stay before and during COVID 19 pandemic.

			Before COVID-19					During COVID-19						
			Poisoning Severity Score (PSS)					Poisoning Severity Score (PSS)						
			None	Minor	Moderate	Severe	Fatal	P value	None	Minor	Moderate	Severe	Fatal	P value
Admission status	No admission	C	0	0	1	0	0	<0.001*	0	0	0	0	0	<0.001*
		%	0.0%	0.0%	1.1%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	
	Observation for few hours	C	7	10	1	0	0		21	3	1	0	0	
		%	11.7%	6.1%	1.1%	0.0%	0.0%		65.6%	1.9%	1.1%	0.0%	0.0%	
	Admission to ward	C	53	152	68	11	0		11	151	74	2	0	
		%	88.3%	92.1%	76.4%	52.4%	0.0%		34.4%	98.1%	82.2%	25.0%	0.0%	
Duration of hospital stay	ICU admission	C	0	3	19	10	2	<0.001*	0	0	15	6	2	<0.001*
		%	0.0%	1.8%	21.3%	47.6%	100.0%		0.0%	0.0%	16.7%	75.0%	100.0%	
	< 24 hours.	C	34	73	22	5	1		30	66	9	0	0	
		%	56.7%	44.2%	24.7%	23.8%	50.0%		93.8%	42.9%	10.0%	0.0%	0.0%	
	24-72 hours.	C	26	89	65	13	0		2	88	79	4	1	
		%	43.3%	53.9%	73.0%	61.9%	0.0%		6.3%	57.1%	87.8%	50.0%	50.0%	
	> 72 hours.	C	0	3	2	3	1		0	0	2	4	1	
		%	0.0%	1.8%	2.2%	14.3%	50.0%		0.0%	0.0%	2.2%	50.0%	50.0%	

*P is significant if < 0.05 – ICU, Intensive care unit.

Table (5): Relation between PSS and the outcome before and during COVID 19 pandemic.

		Before COVID-19					During COVID-19						
		Poisoning Severity Score (PSS)					P value	Poisoning Severity Score (PSS)					P value
		None	Minor	Moderate	Severe	Fatal		None	Minor	Moderate	Severe	Fatal	
Improved and discharge	C	39	106	62	13	0	0.042*	30	127	80	7	0	<0.001*
	%	65.0%	64.2%	69.7%	61.9%	0.0%		93.8%	82.5%	88.9%	87.5%	0.0%	
Discharged on owns responsibility	C	21	58	23	7	0		2	27	9	1	1	
	%	35.0%	35.2%	25.8%	33.3%	0%		6.3%	17.5%	10.0%	12.5%	0	
Referred	C	0	1	4	1	0		0	0	1	0	0.0%	
	%	0.0%	0.6%	4.5%	4.8%	0%		0.0%	0.0%	1.1%	0.0%	0%	
Died	C	0	0	0	0	2		0	0	0	0	2	
	%	0%	0%	0%	0%	100%		0.0%	0.0%	0.0%	0.0%	100%	

*P is significant if < 0.05.

DISCUSSION

The infectious condition known as COVID-19 is brought on by SARS-CoV-2, the severe acute respiratory syndrome coronavirus, which was initially identified in Wuhan, China, in 2019. The WHO declared the coronavirus outbreak to be a pandemic on the 11th of March 2020 (*Ardern, 2020; Celik et al., 2020*).

COVID-19 is affecting mental health, increasing anxiety, depression, loneliness, substance abuse, self-harm, and suicide (*Aboubakr et al., 2023; Rothman and Sher, 2021*). Psychotropic medication is frequently used in suicidal attempts. One significant factor raising the danger of utilizing these drugs in overdose is simply having prescription access to these medications (*Kim et al., 2015*).

The present study sought to investigate the impact of covid-19 pandemic on the pattern of psychotropic drugs' intoxication in Egypt. The study included 623 cases who were presented to the National Environmental and Clinical Toxicology and Research Center (NECTR), Cairo University during the two years period of the study which is 1 year (from February 2019 to January 2020) prior to pandemic and 1 year (from February 2022 to January 2023) throughout pandemic.

In the current work, cases' number presented to NECTR at time of the pandemic (45.9%) has declined in comparison to before the pandemic (54.1%). *Aboubakr et al., (2023)* and *Tan et al. (2022)*, also noted a decrease in the number of intoxicated cases visiting the emergency department in 2020 compared to 2019. Moreover, the current results were congruent with those reported by studies conducted in UK and France (*Cook and Brooke, 2021; Le Roux et al., 2021*). The greatest explanation for this reduction in the presented cases' number through the pandemic is the quarantine restrictions on moving residents of isolated areas (*Aboubakr et al., 2023*).

In contrast, an Australian study by *Ng et al., (2023)* and an American study by *Holland et al., (2021)* reported increase in COVID-19-related toxicological presentations (2020) compared with prior to pandemic (2019).

In the present research, the early adulthood group (18 to <40 years) was the most frequent age group, which represented 58.5% of the cases prior to pandemic period and 70.3% of presented cases throughout the pandemic. In line with other reports, *Aboubakr et al., (2023)* and *Behera et al., (2022)* noted that the age groups of 18 to 40 and, 20 to 30 years, respectively, were the most vulnerable group in their study (38%). According to *Shah et al., (2016)*, most poisoning cases (77.64%) involved were between the ages of 13 – 40, and a report by *Singh et al., (2013)* has shown that 41.82% of all presented cases were between the ages of 21 -30 years.

The elevated incidence of poisoning in this age warrants focused attention and may be linked to significant emotional, social, and economic challenges in Egypt (*El Masry, 2013*). This age group experiences significant pressure to achieve financial independence, in addition to facing familial challenges, marital concerns, and various life transition issues (*Behera et al. 2022*).

In the current work, the psychotropics poisoning rates during both study periods were greater in female patients than in male patients with 66.2% and 75.5, prior to and throughout the pandemic, respectively. In agreement with the present study, the Egyptian study conducted by *Abdelkader et al., (2023)* who stated that rates of poisoning during both prior to and throughout pandemic periods were higher in females with 54.8% and 52.7%, respectively. According to *Esmaily et al., (2016)*, and in line with our obtained results, the findings of Shahid Beheshti Drug and Poison Information Centre (DPIC) demonstrated female predominance (68%) among their cases.

In addition, *Anand and Anand, (2022)* stated that most of the patients presented in northern Poland with suicidal attempts, in both prior to and throughout pandemic periods, were females.

This can be explained by *Abu-Elenin et al., (2022)* who reported that failure in education for young females, reduced employment rate, parental suppression of personal freedom, oppressive attitudes of husbands, early marriage contribute to the incidence of suicide attempts among women.

Moreover, the COVID-19 pandemic exacerbated those factors. This may cause females more vulnerable to psychiatric problems and hence misuse of psychotropic medications.

Concerning the patients' occupational status, it was noticed that the majority of cases were non-workers in the two study periods with 82.5% and 74.5%, respectively. Similarly, **Behera et al., (2022)** have demonstrated that about 50% of the poisoning cases were non-workers. This could be explained by financial hardships, which are linked to psychological anguish, anxiety, and depression. These conditions typically result in self-harm and poisoning, among other aberrant behaviors.

According to our observations, there was an increase in presentations with antipsychotics, sedative hypnotics and anxiolytics overdoses during pandemic period while antidepressants, mood stabilizers and combined psychotropic drugs overdoses have been decreased.

This is consistent with **Helal, (2021)** who observed a remarkable increase in the number of antipsychotic intoxicated children in 2020 compared to 2019. In the UK, **Henry et al., (2021)** reported a decrease in antidepressant and benzodiazepine overdose during pandemic compared to before pandemic period.

The present work revealed a considerable increase in the percentage of suicidal toxicity during pandemic period, this agrees with **Helal et al., (2021)** and **Behera et al., (2022)**. Along with the behavioral alterations, emotional instability, and psychological burden observed during the COVID-19 epidemic, there was a general increase in suicide attempts worldwide. All of these elements could help to explain the rising suicide rate found in this research.

Concerning the drug accessibility among cases in our present study, 16.6%, 23.4% of exposure was with prescribed drugs while non-prescribed drugs represented 83.4%, 76.6% of exposure in both periods, respectively. It indicates the misuse of psychotropic medications and its availability without prescription among the studied population. It was found that the percentage of toxicity with prescribed drugs increased

during pandemic period indicating the increased psychotropics' prescription during the pandemic.

By application of PSS, minor severity was the most common (49.0%, 53.8%), followed by moderate severity (26.4%, 31.5%) while severe presentation was 6.2%, 2.8% in prior to and throughout the pandemic periods, respectively. Similarly, a study conducted by **Mubarak et al., (2019)** revealed that most acute antipsychotic toxicity cases were mild followed by moderate then severe presentation.

It was observed that minor and moderate severity cases increased during pandemic period, while the percentage of cases with none and severe presentation decreased. This contrasts with **Abdelkader et al., (2023)** who discovered a significant reduction in cases with mild PSS and a significant elevation in cases with severe PSS through 2020 compared to 2019.

In our work, majority of cases in both study periods improved and discharged after terminating their treatment course, followed by cases discharged on own's responsibility, and a few of them were referred while died cases represented (0.6% and 0.7%) of cases prior to and throughout the pandemic, respectively. In line with our findings, **Abe et al., (2008)** who stated that all their psychotropics overdose cases were discharged alive and **El-Gharbawy and Ghonem, (2018)** who noted that 93% of cases were cured.

The commonest drug class ingested in patients with severe toxicity regarding the PSS was antipsychotics in both study periods, followed by antidepressants prior to the pandemic and mood stabilizers throughout the pandemic. Likewise, **Stenzel et al., (2014)** stated that among psychotropic drugs, the newer atypical antipsychotics were associated with a more severe PSS grade.

In regard to the hospital stay relation with PSS, we observed that, in the non-PSS category, the majority of cases stayed less than 24 hours. On the other hand, half of cases of fatal PSS category stayed more than 72 hours. Duration of hospital stay seems to increase with increasing the severity grade according to PSS. This finding agreed with **Wahdan and Helal, (2021)** who reported a

significantly strong positive correlation between poisoning severity scoring system and the length of hospital stay.

The current study noticed that all patients of fatal grade PSS died whereas no deaths in other PSS categories were reported. Most cases in all other categories improved and discharged, followed by cases that discharged on their own responsibility. Generally, a psychotropic drug overdose is rarely lethal (*Yanagawa et al., 2010*). In consistency with our results, *Abdelhamid et al., (2021)* reported that the PSS scores could properly predict mortality.

Limitations of the study

The study's retrospective design relies on the accuracy and completeness of medical records, which may be subject to documentation bias or missing data. Additionally, the study was conducted at a single tertiary toxicology center in Egypt, which may limit the generalizability of the results to other regions or healthcare settings.

CONCLUSION

The pattern of psychotropics' acute intoxication has changed significantly during COVID-19 as regards class of psychotropics, manner of toxicity, drug accessibility, PSS and outcome as during the pandemic, there was an increase in the acute toxicity of antipsychotics, sedative hypnotics and anxiolytics, the suicidal pattern, using prescribed drugs, and improved and discharged cases. PSS scores were predictors of cases mortality, where severe and fatal scores were significantly associated with antipsychotics class, early adulthood age group, males before pandemic and females throughout the pandemic period, non-prescribed psychotropic drugs, and ICU admission.

RECOMMENDATIONS

There is an urgent need for more care and restraint in drug dispensing practice as psychotropic medications should be given only by prescriptions. It is recommended to raising public awareness regarding hazardous of psychotropic drugs overdose especially among young adult through media campaigns and educational programs and to enhancing female financial independence and social support to decrease rate of suicidal attempts.

Future prospective, multicenter studies are warranted to validate and expand upon these findings.

Conflict of interest: Authors declare they have no competing interest.

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Abbreviations

NECTR: National Environmental and Clinical Toxicology and Research Center; Covid – 19; coronavirus disease 2019; PSS: Poisoning severity score; SPSS: statistical package for the Social Sciences; P-values: probability value; ICU: intensive care unit.

REFERENCES

1. **Abdelhamid, W. G.; Wahdan, M. and Abdel Wahab, H. (2021):** Geriatric intoxication in poison control center of Ain Shams University Hospitals, Egypt, 2019. *Egyptian Fam. Med. J.*, 5(2): 64–80.
2. **Abdelkader, S. I.; Abdelhamid, W. G.; Wahdan, M. M. et al. (2023):** Assessment of severity and outcome of poisoning before and during the era of COVID-19 pandemic. *Toxicol. Anal. Clin.*, 35(2):151–159.
3. **Abe, T.; Tokuda, Y.; Stein, G. H. et al. (2008):** Risk factors associated with prolonged hospital stay in admitted patients with psychotropic drug overdose. *Open Crit. Care Med. J.*, 1(1):12–16.
4. **Aboubakr, H. M.; Kotb, N. A. E. M., Shaban, F. et al. (2023):** The impact of COVID-19 on intoxication pattern by drugs of abuse in Egypt. *Int. J. Med. Toxicol. Forensic Med.*, 13(1): 39497.
5. **Abu-Elenin, M. M.; Elshora, A. A.; Sadaka, M. S. et al. (2022):** Domestic violence against married women during the COVID-19 pandemic in Egypt. *BMC Women's Health* 22: 94. Doi:10.1186/s12905-022-01674-5.
6. **Anand, L. S. and Anand, J. S. (2022):** Self-poisonings before and during the initial year of the COVID-19 pandemic in northern Poland. *Int. J. Occup. Med. Environ. Health*, 35(5):527–535.
7. **Ardern, J. (2020):** Prime minister: COVID-19 alert level increased. Available at: *Beehive. govt. nz*, 23.
8. **Behera, A.; Singla, N.; Sharma, N. et al. (2022):** Paradigm shift in pattern and prevalence of poisoning during COVID-19 pandemic. *J. Fam. Med. Prim. Care*, 11(1): 208.

9. Celik, I.; Saatci, E. and Eyüboğlu, A. F. (2020): Emerging and reemerging respiratory viral infections up to Covid-19. *Turk. J. Med. Sci.*, 50(9): 557-562.
10. Chan, Y. H. (2003): Biostatistics 103: qualitative data-tests of independence. *Singapore Med. J.*, 44(10): 498-503.
11. Cook, M. A. and Brooke, N. (2021): Event-based surveillance of poisonings and potentially hazardous exposures over 12 months of the COVID-19 pandemic. *Int. J. Environ. Res. Public Health*, 18(21): 11133.
12. Corcoran, P.; Heavey, B.; Griffin, E. et al. (2013): Psychotropic medication involved in intentional drug overdose: Implications for treatment. *Neuropsych.*, 3(3): 285.
13. de Oliveira Costa, J.; Gillies, M. B.; Schaffer, A. L. et al. (2022): Changes in antidepressant use in Australia: A nationwide analysis (2015–2021). *Australian, New Zealand J. Psych.*, 00048674221079740.
14. El Masry, M. and Tawfik, H. (2013): 2011 Annual report of the poison control centre of Ain Shams University Hospital, Cairo, Egypt. *Ain Shams J. Forensic Med. Clin. Toxicol.*, 20(1): 10-17.
15. El-Gharbawy, D. M. and Ghonem, M. M. (2018): ECG changes as a predictive tool of outcomes in antipsychotics poisoned patients. *Ain Shams J. Forensic Med. Clin. Toxicol.*, 31: 51-61.
16. Elmadah, E. (2012): Pattern of acute poisoning in adult patients admitted to Tanta poison center - Egypt. *Egyptian J. Forensic Sci. App. Toxicol.*, 12:63-77. Doi:10.12816/0005060.
17. Esmaily, A.; Alavian, G.; Afzal, G. et al. (2016): Psychotropic agents poisoning: Analysis of cases reported to Shahid Beheshti Drug and Poison Information Center. *Int. J. Med. Toxicol. Forensic Med.*, 6(1):7-11.
18. Gummin, D. D.; Mowry, J. B.; Beuhler, M. C. et al. (2021): 2020 Annual report of the American association of poison control centers' national poison data system (NPDS): 38th annual report. *Clin. Toxicol.*, 59(12): 1282-1501.
19. Helal, N. (2021): Impact of COVID-19 lockdown on acute pediatric antipsychotic poisoning outcome in Tanta University poison control centre. *Ain Shams J. Forensic Med. Clin. Toxicol.*, 37(2): 67-77.
20. Henry, N.; Parthiban, S. and Farroha, A. (2021): The effect of COVID-19 lockdown on the incidence of deliberate self-harm injuries presenting to the emergency room. *Int. J. Psych. Med.*, 56(4): 266-277.
21. Hirano, Y. (2020): Risk of extrapyramidal syndromes associated with psychotropic polypharmacy: A study based on large-scale Japanese claims data. *Therap. Innov. Reg. Sci.*, 54(2): 259-268.
22. Holland, K. M.; Jones, C.; Vivolo-Kantor, A. M. et al. (2021): Trends in US emergency department visits for mental health, overdose, and violence outcomes before and during the COVID-19 pandemic. *JAMA Psych.*, 78(4): 372-379.
23. Kim, J.; Kim, M.; Kim, Y. R. et al. (2015): High prevalence of psychotropics overdose among suicide attempters in Korea. *Clini. Psychopharmacol. Neurosci.*, 13(3): 302.
24. Le Roux, G.; Sinno-Tellier, S.; Puskarczyk, E. et al. (2021): Poisoning during the COVID-19 outbreak and lockdown: retrospective analysis of exposures reported to French poison control centers. *Clin. Toxicol.*, 59(9): 832-839.
25. Mazzilli, R.; Curto, M.; De Bernardini, D. Et al. (2021): Psychotropic drugs levels in seminal fluid: A new therapeutic drug monitoring analysis? *Front. Endocrinol.*, 12: 620936.
26. Mowry, J. B. I.; Spyker, D. A. I.; Brooks, D. E. et al. (2016): 2015 Annual report of the American association of poison control centers' national poison data system (NPDS): 33rd annual report. *Clin. Toxicol.*, 54: 924-1109.
27. Mubarak, M.; El Madah, E.; El Gharbawy, D. et al. (2019): Assessment of acute antipsychotic poisoned cases admitted to Tanta University Poison Control Unit. *Ain Shams Journal of Forensic Medicine and Clinical Toxicology*, 33(2), 113-125.
28. Ng, R. W.; Emmerig, D.; Salter, M. D. et al. (2023): Toxicology presentations to a tertiary unit in New South Wales during the COVID-19 pandemic first wave: A retrospective comparison study. *Emerg. Med. Australasia*, 35(1): 105-111.
29. Rothman, S. and Sher, L. (2021): Suicide prevention in the COVID-19 era. *Prev. Med.*, 152: 106547.
30. Shah, S. M.; Asari, P. D. And Amin, A. J. (2016): Clinico-epidemiological profile of patients presenting with acute poisoning. *Int. J. Curr. Res. Rev.*, 8(13): 35.

31. **Singh, S. P.; Aggarwal, A. D., Oberoi, S. S. et al. (2013):** Study of poisoning trends in north India-a perspective in relation to world statistics. *J. Forensic Legal Med.*, 20(1): 14-18.
32. **Stenzel, J.; Ruhnau, L. and Eyer, F. (2014):** Retrospective analysis of poisonings with newer psychotropic drugs. *34th Int. Cong. Euro. Assoc. Poisons Cent. Clin. Toxicol. (EAPCCT)*, 52(4): 296.
33. **Tan, S. T.; Chen, T. H.; Yang, H.W et al. (2022):** Changes in poisoning during the COVID-19 pandemic worldwide. *Amer. J. Emerg. Med.*, 56: 291-293.
34. **Wahdan, A. and Helal, N. (2021):** Comparing the effectiveness of three scoring systems in outcome prediction of acute tricyclic antidepressants poisoning cases. *Ain Shams J. Forensic Med. Clin. Toxicol.*, 37(2): 136-149.
35. **Yanagawa, Y.; Miyazaki, M. and Sakamoto, T. (2010):** Relationship between abnormal pupillary reactivity and the outcome of a psychotropic drug overdose *Amer. J. Emerg. Med.*, 28(6): 703-707.