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Epidemiological and clinical characteristics of opium poisoning compared to other opioids in a poisoning referral center: Registry based study

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ABSTRACT

Background: This study aimed to compare the clinicoepidemiological characteristics of opium poisoning with other types of opioids and analyze factors associated with opium poisoning.
Methods: This cross sectional study was conducted on patients with opioid poisoning from may 5, 2023 until may 5, 2024. Patients were divided into two groups: those with opium poisoning and those with other types of opioid poisoning. Data related to epidemiological, toxicological and clinical examinations as well as outcomes were collected.
Results: This study included a total of 762 patients with opioid poisoning over a one-year period, of whom 126 had ingested opium. Patients with opium poisoning were older, married, less educated and had a higher prevalence of underlying diseases compared to patients with other types of opioid poisoning. There was a significant difference between the two groups in terms of their level of consciousness ($P < 0.001$). Confusion, stupor and coma were more prevalent among those with opium poisoning. There was no statistically significant difference in terms of intubation and outcome in both groups ($P > 0.05$). Multivariable logistic regression in opium poisoning revealed that for every one-year increase in age, the odds of opium poisoning increased by up to 5 % (OR = 1.05, 95 %CI (1.03–1.07); $P < 0.001$) compared to other opioid poisoning. In total 10 patients died, with 2 of them ingesting opium.
Conclusion: These findings could be helpful for risk assessment, management of opium poisoning and prevention strategies for the high-risk group.

Introduction

Opioids are a class of synthetic or semi-synthetic drugs extracted from or mimicking natural substances derived from the opium poppy plant, one of the oldest medicinal herbs known to k humanity(Dart et al., 2015; KuKanich and Wiese, 2015).

Opium is the highly addictive, milky substance extracted by cutting the unripe capsules of the Papaver somniferum plant(Martínez and Ballesteros, 2019). It comes in various forms, including crude opium, dross, refined opium, and opium sap . Opium and its derivatives are widely utilized in medical centers to relieve acute pain. While they offer significant therapeutic benefits, their misuse and dependence have become a major public health concern(Volkow et al., 2019). The Islamic Republic of Iran is located on the transit routes for opiates smuggled in the world and opium is the common drug of choice in this country. The historical roots of opium and its derivatives use in Iran have led an increase in prevalence of opium abuse compared to other illicit drugs.

Acute opiate overdose is one of the main complications of drug abuse and a leading cause of mortality among drug users(Karbakhsh and Zandi, 2007). There were 91,799 fatal drug poisonings in the United States in 2020 with opioids accounting for 75 % of them(Spencer et al., 2022). Asian countries remain the leading producers of illicit opiates

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(Noohi et al., 2011), posing significant challenges for developing nations (Alinejad et al., 2017).

It seems that the pattern of illicit drug abuse varies across provinces of Iran(Ayatollahi et al., 2011; Azarakhsh et al., 2021).

A systematic review and meta-analysis in Iran presented that opium and its derivatives are one of the most common illicit drugs consumed in this country(Derhami et al., 2021). Opium itself is in the first rank, and its residue called "dross" is in the second rank(Noohi et al., 2011).

A meta-analysis study was conducted to estimate the opium abuse prevalence for Iranian young people showing that the prevalence of opium abuse in Iranian youth students is higher than for in other countries with rates 6.0 % for male, 2.0 % for female, and 4.0 % for mixed group (Menati et al., 2017).

Studies from Isfahan,Tehran,and Birjand have reported opioid poisoning as one of the most common cause of acute poisoning resulting in hospitalization(Hadeiy et al., 2022; Eizadi-Mood et al., 2024; Naseri et al., 2023).

The factors contributing to drug poisoning are multifaceted and complex. They can include individual risk factors such as age, gender, mental health issues, and genetics, as well as environmental factors such as availability and accessibility of drugs, social norms and attitudes towards drug use, and socioeconomic status. The use of multiple drugs, known as polypharmacy, can also increase the risk of drug poisoning (Heydarian and Azar, 2024).

Drug poisoning is a significant public health issue To address this issue and considering the high prevalence of opium abuse in our country, it is imperative to conduct a comprehensive epidemiological and clinical analysis of the current situation to improve treatment outcomes and implement appropriate preventive measures(Mattson, 2018).

Thus we conducted a study to evaluate the epidemiological and clinical aspects of opium poisoning in comparison with other types of opioids and analyze the factors associated with opium poisoning in patients admitted to a referral poisoning center over a one-year period

Method

Study design and setting

This is a cross sectional study on data from the registration system of consecutive patients presented at the Khorshid Hospital's Poisoning Emergency Center (KHPEC) from May 5, 2023 to May 5, 2024. This hospital is a teaching tertiary hospital in Isfahan, Iran, that serves local residents and out-of-state referrals, making it one of the largest hospitals with a toxicology center in the center of Iran. Data were extracted from the data registry system (Ethical code IR.MUI.MED.REC.1400.097) (Eizadi-Mood et al., 2025). This study was approved by the ethics committee of the Review Board of Isfahan University of Medical Science under the code of IR.MUI.REC.1403.018 and in accordance with the principles of the Declaration of Helsinki.

Participants

During the study period all patients with opioid poisoning who had been hospitalized in the emergency room, department, or intensive care unit of KHPEC were included in our study.

All pantients completed written consent form. The patients with exclusive opioid poisoning were divided into two groups: 1)patients with opium poisoning including opium, refined opium extracts (Shireh), dross and opium syrup, and 2) patients with other types of opioid poisoning except opium including methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine and dextromethorphan.

Additionally, in our analyses, patients with opioid poisoning with and without other substances (including drugs, alcohol and stimulants) were divided into two groups: 1)patients with opium poisoning including opium, refined opium extracts (Shireh), dross and opium syrup with other substances,and 2) patients with combination of other types of opioid poisoning (methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine, and dextromethorphan) and other substances. This part was added in the supplementary section.

Data collection

The following data were collected using the KHPEC data registration system: demographic information (age, gender, nationality), type of opioid substance, route of exposure (oral, dermal, inhalation, parenteral, multiple exposures and unknown), mode of poisoning (accidental, intentional, induced, overdose), past medical history (including any chronic disease such as diabetes, hypertension, cardiovascular disease, renal and hepatic disease, neurological disease, etc.), past drug history, history of psychiatric disease, being under psychiatric treatment or not, previous suicide attempts and numbers, self-harm history, criminal record history, clinical manifestations on admission, average duration of hospitalization, CPR(cardio pulmonary resuscitation), intubation and outcome (in hospital mortality or recovery).

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 16 of (SPSS Inc., Chicago, IL, USA). Quantitative variables were presented as mean ±standard deviation [SD] and categorical variables were presented as frequency (percentage). Normality of continuous varables was assessed using the Kolmogrov-Smirnov test and Q-Q plot. Chi-square or Fisher's exact test were used to compare categorical variables between groups. Independent samples *t*-test or Mann-Whitney nonparametric test were used for comparing normally and non-normally distributed continuous variables between groups, respectively. Multivariable binary logistic regression was used for evaluating the association those significant predictors of opium poisoning in univariate analyses. Results of logistic regression were reported as odds ratio (OR) and 95 % confidence interval for OR. P value <0.05 was considered statistically significant.

Results

This study included a total of 762 patients who experienced exclusive opioid poisoning over a one-year period, of whom 126 had ingested opium. The mean± SD age of the patients was 42.18 ± 18.00 years (minimum; maximum: 2–90 years). Of the patients, 587 (77.0 %) were men (male to female ratio = 3.35).

Table 1 presents the demographic, toxicological and past medical history of patients with exclusive opioid poisoning. There was a significant difference between the two groups in terms of age, level of education, marital status, route of exposure, criminal record, past medical history and drug history. Patients with various types of opium poisoning were significantly older, married, and had a history of oral exposure, as well as past medical and drug histories ($P < 0.05$). Regarding gender, there was no significant difference between the two groups; 78.6 % of patients with opium poisoning and 76.7 % of patients with other opioid poisoning were men.

Clinical manifestations and outcomes of patients with exclusive opium poisoning compared to other types of opioid poisoning are presented in Table 2. There was a significant difference between the two groups in terms of their level of consciousness, diastolic blood pressure, pulse rate and respiratory examination ($P < 0.05$). Patients with opium poisoning had a higher proportion of confusion/delirium, lethargy and comatose status. There was no statistically significant difference with respect to CPR, intubation and outcome in both groups ($P > 0.05$). In total 10 patients died, with 2 of them ingesting opium (Table 2).

Multivariable logistic regression in opium poisoning revealed that for every one-year increase in age, the odds of opium poisoning increase by up to 5 % (OR = 1.05, 95 %CI (1.03–1.07); $P < 0.001$) compared to

Table 1
Demographics, toxicological findings, and past medical history of patients with exclusive opioid poisoning based on the type of opioid substances.

		Total $N = 762$	Opium $N = 126$	Other opioids $N = 636$	P-value
Age (year)		42.18 ± 18.00	54.88 ± 17.78	39.75 ± 17.11	<0.001
Gender	Female	175 (23.0 %)	27 (21.4 %)	148 (23.3 %)	0.65
	Male	587 (77.0 %)	99 (78.6 %)	488 (76.7 %)	
Education level	Illiterate	54 (8.0 %)	18 (16.4 %)	36 (6.4 %)	0.03
	Under diploma	349 (51.6 %)	51 (46.4 %)	298 (52.7 %)	
	Diploma	219 (32.4 %)	36 (32.7 %)	183 (32.3 %)	
	College education	54 (8.0 %)	5 (4.5 %)	49 (8.7 %)	
Marital status	Single	297 (39.0 %)	25 (20.3 %)	272 (43.2 %	<0.001
	Married	432 (56.7 %)	96 (78.0 %)	336 (53.3 %)	
	Divorced	16 (2.1 %)	0 (0.0 %)	16 (2.5 %)	
	Widow	8 (1.0 %)	2 (1.6 %)	6 (1.0 %)	
Route of exposure	Oral	684 (90.1 %)	86 (68.3 %)	598 (94.3 %)	<0.001
	Inhalation	20 (2.6 %)	11 (8.7 %)	9 (1.4 %)	
	Injection	5 (0.7 %)	0 (0.0 %)	5 (0.8 %)	
	Dermal	1 (0.1 %)	0 (0.0 %)	1 (0.2 %)	
	Multiple exposure	19 (2.5 %)	11 (8.7 %)	8 (1.3 %)	
	Unknown	33 (4.3 %)	18 (14.3 %)	15 (2.4 %)	
Intentionality	Intentional	455 (60.1 %)	70 (56.0 %)	385 (60.9 %)	0.12
	Induced	18 (2.4 %)	6 (4.8 %)	12 (1.9 %)	
	Accidental	284 (37.5 %)	49 (39.2 %)	235 (37.2 %)	
Past medical history	Yes	226 (29.7 %)	53 (42.1 %)	173 (27.2 %)	0.001
	No	536 (70.3 %)	73 (57.9 %)	463 (72.8 %)	
Past drug history	Yes	227 (29.8 %)	48 (38.1 %)	179 (28.1 %)	0.026
	No	535 (70.2 %)	78 (61.9 %)	457 (71.9 %)	
History of psychiatric disease	Yes	149 (19.6 %)	21 (16.7 %)	128 (20.1 %)	0.37
	No	613 (80.4 %)	105 (83.3 %)	508 (79.9 %)	
Under psychiatric treatment	Yes	82 (10.8 %)	10 (7.9 %)	72 (11.3 %)	0.26
	No	680 (89.2 %)	116 (92.1 %)	564 (88.7 %)	
Number of past suicides			1.15 (0.90)	1.42 (1.26)	0.45
Addiction history	Yes	518 (68.0 %)	88 (69.8 %)	430 (67.6 %)	0.62
	No	244 (32.0 %)	38 (30.2 %)	206 (32.4 %)	
Suicide history	Yes	101 (13.3 %)	10 (7.9 %)	91 (14.3 %)	0.054
	No	661 (86.7 %)	116 (92.1 %)	545 (85.7 %)	
Suicide family history	Yes	16 (2.1 %)	2 (1.6 %)	14 (2.2 %)	0.49
	No	746 (97.9 %)	124 (98.4 %)	622 (97.8 %)	
Criminal record history	Yes	62 (8.1 %)	3 (2.4 %)	59 (9.3 %)	0.010
	No	700 (91.9 %)	123 (97.6 %)	577 (90.7 %)	
Self-harm history	Yes	46 (6.0 %)	4 (3.2 %)	42 (6.6 %)	0.14
	No	716 (94.0 %)	122 (96.8 %)	594 (93.4 %)	

Results are presented as number (percent) or mean ± SD; Categorical variables were compared between groups with Fisher's exact or Chi-square tests and independent samples *t*-test (or non-parametric Mann-Whitney U test) for categorical and continuous data, where appropriate. P value <0.05 was considered statistically significant.

other types of opioid poisoning (Table 3).

Additionally, in our analyses, patients with opioid poisoning with and without other substances were added in supplementary section. Table S1 presents demographic and toxicological characteristics of patients with opioid poisoning (with or without other substances). Significant differences were found in age, level of education, marital status, exposure route, past medical and drug history, history of suicide and self-harm and criminal record history ($P < 0.05$). Table S2 summarizes clinical features and outcomes of patients with opioid poisoning (with or without other substances) based on opium posioing or other type of opioid. Significant differences were found in level of consciousness, O2 saturation, pupil size, lung sound and DTR examination ($P < 0.05$).

Table S3 presents logistic regression results. Older age (OR: 1.03, 95 % CI (1.02–1.05); $P < 0.001$), and the induced route (OR: 2.88, 95 % CI (1.09–7.63); $P = 0.017$) were associated with a higher risk for opium poisoning compared to other types of opioid poisoning(with or without other substances). On the other hand, being single and the oral route of exposure are protective against opium poisoning compared to other types of opioid poisoning(with or without other substances) ($P < 0.05$).

Discussion

Opium, the crudest and least potent form of opiate, is commonly consumed through smoking or ingestion(Azarakhsh et al., 2021). Opium is more commonly misused in Middle East and Asia than in the United States. Opium abuse is spreading across Iranian society for a variety of reasons (Azarakhsh et al., 2021) and is leading to an increase in associated adverse effects such as poisoning. To effectively implement preventive strategies for this disease, a comprehensive understanding of it and the factors affecting it is needed(Mattson, 2018).

The main purpose of this study was to evaluate the characteristics of opium poisoning in comparison with other types of opioids in patients hospitalized at the poisoning emergency center of Khorshid Hospital over a 1-year-period.

Our findings suggest a relatively similar pattern of clinical, epidemiological, and toxicological factors in opium poisoning compared to poisoning from other opioids. All opioids, including opium, act on the same opioid receptors, leading to similar symptoms of poisoning (Regina et al., 2025).

The most frequently observed symptoms of poisoning among the patients were drowsiness, and a decreased level of consciousness (Ramezanzadeh et al., 2024).

But while it's true that opium poisoning, like other opioid intoxications, can lead to confusion, delirium, lethargy, and a comatose status, the statement that it has a higher rate compared to other opioids is not fully supported by evidence. Opioid-induced neurotoxicity is a multifactorial syndrome, and the severity of symptoms can vary depending on the specific opioid, the dose, and individual factors

Table 2
Clinical manifestation and outcome of patients with exclusive opioid poisoning based on the type of opioid substances.

Variables		Total $N = 762$	Opium $N = 126$	Other opioids $N = 636$	P-value
Level of consciousness	Alert	546 (71.9 %)	77 (61.1 %)	469 (74.1 %)	0.001
	Confusion/ delirium	61 (8.0 %)	18 (14.3 %)	43 (6.8 %)	
	Lethargy	77 (10.1 %)	19 (15.1 %)	58 (9.2 %)	
	Obtundation	23 (3.0 %)	1 (0.8 %)	22 (3.5 %)	
	Stupor	38 (5.0 %)	6 (4.8 %)	32 (5.1 %)	
	Coma	14 (1.8 %)	5 (4.0 %)	9 (1.4 %)	
Systolic blood pressure	MmHg	122.48 ± 19.62	119.77 ± 19.87	123.03 ± 19.31	0.086
Diastolic blood pressure MmHg		77.02 (13.49)	74.33 (14.43)	77.63 (13.12)	0.012
Pulse rate		91.82 (18.42)	87.88 (17.37)	92.53 (18.49)	0.010
Respiratory rate		16.91 (7.53)	17.33 (8.49)	16.86 (7.45)	0.53
O2 saturation		90.13 (29.59)	87.62 (12.59)	90.65 (32.36)	0.30
Temperature		37.048 ± 2.98	36.93 ± 0.35	37.08 ±3.32	0.62
Pupil	Normal	336 (45.5 %)	45 (37.2 %)	291 (47.1 %)	0.059
	Miosis	361 (48.8 %)	71 (58.7 %)	290 (46.9 %)	
	Mydriasis	42 (5.7 %)	5 (4.1 %)	37 (6.0 %)	
Pupil reflex	Yes	757 (99.3 %)	125 (99.2 %)	632 (99.4 %)	0.83
	No	5 (0.7 %)	1 (0.8 %)	4 (0.6 %)	
Heart sound	Abnormal	76 (10.0 %)	13 (10.3 %)	63 (9.9 %)	0.89
	Normal	686 (90.0 %)	113 (89.7 %)	573 (90.1 %)	
Respiratory examination	Abnormal	42 (5.5 %)	12 (9.5 %)	30 (4.7 %)	0.019
	Normal	720 (94.5 %)	114 (90.5 %)	606 (95.3 %)	
Bowel sound	Abnormal	2 (0.3 %)	0 (0.0 %)	2 (0.3 %)	0.53
	Normal	760 (99.7 %)	126 (100.0 %)	634 (99.7 %)	
Nausea and vomiting	Yes	130 (17.1 %)	24 (19.0 %)	106 (16.7 %)	0.52
	No	632 (82.9 %)	102 (81.0 %)	530 (83.3 %)	
Diarrhea	Yes	5 (0.7 %)	1 (0.8 %)	4 (0.6 %)	0.83
	No	757 (99.3 %)	125 (99.2 %)	632 (99.4 %)	
Abdominal pain	Yes	32 (4.2 %)	3 (2.4 %)	29 (4.6 %)	0.27
	No	730 (95.8 %)	123 (97.6 %)	607 (95.4 %)	
Neurological examination	Abnormal	3 (0.4 %)	0 (0.0 %)	3 (0.5 %)	0.44
	Normal	759 (99.6 %)	126 (100.0 %)	633 (99.5 %)	
Reflex of extremities	Asymmetric	1 (0.1 %)	0 (0.0 %)	1 (0.2 %)	0.83
	Symmetric	761 (99.9 %)	126 (100.0 %)	635 (99.8 %)	
Muscle force	Asymmetric	4 (0.5 %)	0 (0.0 %)	4 (0.6 %)	0.37
	Symmetric	758 (99.5 %)	126 (100.0 %)	632 (99.4 %)	
DTR	Hyperreflexia	5 (0.7 %)	2 (1.6 %)	3 (0.5 %)	0.35
	Normal	747 (98.0 %)	122 (96.8 %)	625 (98.3 %)	
	Hyporeflexia	10 (1.3 %)	2 (1.6 %)	8 (1.3 %)	
Plantar reflex	Extension	10 (1.3 %)	1 (0.8 %)	9 (1.4 %)	0.80
	Mute	22 (2.9 %)	3 (2.4 %)	19 (3.0 %)	
	Flexion	730 (95.8 %)	122 (96.8 %)	608 (95.6 %)	
Intubation	Yes	36 (4.7 %)	6 (4.8 %)	30 (4.7 %)	0.98
CPR	Yes	10 (1.3 %)	2 (1.6 %)	8 (1.3 %)	0.44
Outcome	Mortality	10 (1.4 %)	2 (1.8 %)	8 (1.4 %)	0.75
	Recovery	689 (98.6 %)	112 (98.2 %)	577 (98.6 %)	

Deep tendon reflex (DTR), Results are presented as number (percent) or mean ± SD for categorical and continuous data; Categorical variables were compared between groups with Fisher's exact or Chi-square tests and independent samples *t*-test (or non-parametric Mann-Whitney U test) for categorical and continuous data, where appropriate. P value <0.05 was considered statistically significant.

Table 3
Logistic regression analysis of the factors associated with opium poisoning compared to other types of opioid poisoning in patients with opioid poisoning.

variables		Multivariable OR (95 % CI)*	P- value
Age		1.05 (1.03–1.07)	<0.001
Level of education	Illiterate	1	–
	Under diploma	0.52 (0.25–1.08)	0.08
	Diploma	0.72 (0.33–1.58)	0.41
	College education	0.49 (0.15–1.62)	0.25
Marital status	Single	1.75 (0.27–11.59)	0.56
	Married	2.14 (0.36–12.82)	0.40
	Divorced	N.C	N.C
	Widow/	1	–
Past medical history	Yes	1.10 (0.66–1.85)	0.71
Past drug history	Yes	1.04 (0.63–1.72)	0.88
Criminal record history	Yes	0.28 (0.07–1.20)	0.086

N.C: Not computable.
* OR: Odds ratio and 95 % confidence interval for OR.

(Gallagher, 2007).

Reports indicate that tramadol and methadone, along with opium, are significant contributors to opioid toxicity cases in Iran (Ramezanzadeh et al., 2024; Alinejad et al., 2017). The most commonly reported side effect of tramadol was seizures(Ramezannezhad et al., 2024).

According to the results of studies, an increase in the frequency of seizures in tramadol abuse is more common in countries such as Iran and Egypt, where there are more illegal forms of tramadol. This may explain a higher prevalence of comas in patients with opium poisoning compared with the most common ot other opioids(Fawzi, 2011).

Our findings revealed a significantly higher prevalence of opium poisoning in patients of older age, those with underlying diseases, married individuals and poorly educated patients compared to other types of opioids. The majority of patients with opium poisoning were over 60 years old and had a history of addiction. For every one-year increase in age, the odds of opium poisoning increase by up to 5 %. This aligns with a study conducted in Tehran over a 5-year period, which found that opium was among the most frequent agents in patients 50 years of age and older (Mesgarpour et al., 2024). Experiencing isolation drives the elderly to seek solace in drugs to escape their emotional

distress filling voids in their lives, and achieving a sense of relaxation (Abedi et al., 2024).

Consistent with studies conducted in Tehran(Azarakhsh et al., 2021) and Yazd(Lotfi et al., 2012), opium misuse and poisoning were significantly more prevalent among married patients. Although the reason for this finding is unclear, long-term committed relationships, such as marriage, provide the primary form of social support for many individuals. The absence of a close and personal relationship with a partner could have a reverse effect(Heinz et al., 2009). Failed marriages, economic problems, and social pressures particularly in traditional societies could play an important role(Azarakhsh et al., 2021). However, these parameters could not be derived from our 1-year study due to its retrospective nature.

Furthermore, our findings revealed a significantly higher prevalence of underlying medical conditions among patients experiencing opium poisoning compared to those with other opioid poisonings. This association may be attributed to several factors. Firstly, individuals with pre-existing health conditions may be more susceptible to the adverse effects of opium, particularly respiratory depression and cardiac complications. Secondly, chronic pain associated with underlying medical conditions may drive individuals to seek relief through opioid use, often leading to potential dependence and addiction due to the powerful pain-relieving effects of these medications, especially when other treatment options seem limited or ineffective.

However opium abuse and comorbidity can often occur together with previous studies indicating that opium consumption may lead to cardiometabolic diseases, ototoxic effects, and an increased risk of various cancers(Masoudkabir et al., 2013; Rawool and Dluhy, 2011; Kamangar et al., 2014). Causality cannot be drawn from cross-sectional studies.

Similar to Azarakh et al.(Azarakhsh et al., 2021) the majority of patients with opium poisoning had lower level of education. The level of education is an important determinant of socioeconomic status which could independently be associated with overdose propensities(Powell, 2023). From 2019 to 2021, the overdose death rate for those with no college education increased about 7 fold more than those with at least some college education(Powell, 2023).

In our study 1.6 % of cases of opium poisoning required mechanical ventilation. The mortality rate was 1.8 % which was higher than in similar studies(Ayatollahi et al., 2011). A previous study by Izadi. et al. reported that patients poisoned by non-pharmaceutical substances had a significantly higher risk of mortality(Eizadi-Mood et al., 2024). Limitations of the current study include the study's cross-sectional nature, of single-centre registry study and the reliance on self-report measures. In addition no control over confounding factors (e.g., unmeasured variables like dose, comorbidities) was performed. Also, regional variations in opioid use (e.g., opium prevalence in Iran vs. synthetic opioids elsewhere) may limit external validity. Morever, residual confounding may exist if other substances influence outcomes.

Conclusion

This study provides valuable insights into the epidemiological and clinical features of opioid poisoning, with focusing specifically on opium toxicity in Iran. The findings reveal a unique risk profile associated with opium poisoning, including advanced age, comorbidities, marital status, and lower educational attainment. These risk factors highlight the importance of targeted and stratified prevention strategies. Public health policies should prioritize educational outreach programs tailored to individuals with limited formal education, while also integrating screening and early intervention for older adults and those with chronic health conditions. Community-based initiatives can be adapted to reach married individuals principally within households where opium use may be culturally or socially normalized. By aligning national prevention efforts with these risk indicators, policymakers can develop more effective, equitable, and evidence-based strategies to reduce the burden of opioid poisoning and improve health outcomes among vulnerable populations.

CRediT authorship contribution statement

Rokhsareh Meamar: Writing – review & editing. **Sami Ebrahimi:** Conceptualization. **Arman Otroshi:** Data curation, Writing – review & editing. **Awat Feizi:** Formal analysis, Methodology, Validation, Writing – review & editing. **Nastaran Eizadi-Mood:** Methodology, Project administration, Writing – review & editing.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Nastaran Eizadi-Mood reports writing assistance was provided by Isfahan University of Medical Sciences. Nastaran Eizadi-Mood reports a relationship with Isfahan University of Medical Sciences that includes: board membership. Nastaran Eizadi-Mood has patent pending to i. Conflict of interest: The authors declared there is no conflict of interest Funding: No Funding Informed Consent: This research has been performed in accordance with the Declaration of Helsinki and has been approved by the ethics committee of Isfahan University of Medical Sciences. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.etdah.2025.100177.

Data availability

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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