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THE RELATIONSHIP BETWEEN THE PROGNOSIS OF POISONING WITH METHADONE AND THE NURSING CARE PROVIDED IN HOSPITALS OF ISFAHAN, IRAN

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ABSTRACT

Purpose: Poisoning is a major cause of hospitalization and death in children. It is mainly cause by the accidental use of toxic substances and drugs. Prognosis depends on many factors. This study investigated the prognosis of poisoned children based on the provided nursing care.
Methods:This cross-sectional study was conducted on medical records of 93 children poisoned with methadone (selected through census) who were hospitalized and treated in Imam Hussein and Noor and Ali Asqar Hospitals (Isfahan, Iran). The severity of poisoning was estimated based on factors such as neural correlates of consciousness,level of consciousness,respiratory conditions,oxygen saturation,pulse,blood pressure,skin color and body temperature.The patients' age, used dose of methadone and simultaneous use of other substances were also collected. The collected data were then analyzed and compared.
Results: Most cases of poisoning with oral methadone were observed in boys and five-year-old children. Most nursing care measures, e.g. immediate naloxone injection,were provided with one hour after patient admission. Moreover, 34% of the patients received naloxone infusion after primary naloxone injection. The severity of poisoning was mild-moderate in all cases. Additional measures , e.g. ventilation , consciousness monitoring , nasogastric intubation and gastric lavage , using charcoal , urinary catheterization , fluid absorption and excretion control and other paraclinical actions (such as obtaining electroencephalograms, electrocardiograms and computed tomography (CT)scans), were performed in more severe cases. Finally,one death and two cases of brain death was reported.
Conclusion: Immediate and appropriate nursing care measures can prevent the irreparable effects of poisoning and even death,especially in children. They can also significantly improve prognosis. In this respect,appropriate training of nurses in pediatric emergency departments seems necessary.

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Introduction

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Accidental methadone poisoning threatens children's lives in countries where methadone maintenance treatment (MMT) is used[1,2].

Although most cases of poisoning in children under two years of age are caused by accidental ingestion of toxic substances and drugs, some parents intentionally use such substances to calm or even kill their children. In fact, poisoning, either intentional or accidental, is a fairly common medical emergency[2-3].

According to the American Association of Poison Control Centers (AAPCC), 2.2 million cases of poisoning, including 1000 cases of death due to poisoning, are annually reported. Over 50% of these cases occur in children under five years of age and are mainly accidental. In more than 90% of cases, children come in contact with poisonous materials at home, particularly in the child's own house. Family stress, crowded houses, recent changes, parents' unemployment, large family size, young mothers, and economic and cultural issues can all play a significant role in the incidence of poisoning in children[1,4,5].

In some regions of Iran, drugs are responsible for more than half of the cases of poisoning and up to 91% of deaths due to poisoning in children. According to the Iranian Legal Medicine Organization, 11000 cases of poisoning with methadone syrup (constituting 40% of all poisoning cases in children) have been recorded during the past four years in the country. Unfortunately, 200 of these cases have resulted in death. In 2005, 3650 children were admitted to Loghman-e-Hakim Hospital (Tehran, Iran) due to poisoning and 40 of these children died. In 2000, 10556 poisoning deaths were reported in eight states of the USA. Most of these cases (more than 90%) had happened at home[6].

On average, one drug-addicted baby was born every 19 minutes in the USA in 2013. According to the National Health Service, 7800 drug-dependent infants were born in the UK in 2014. Of these, 40 were suffocated and 13 died because of poisoning following the ingestion of methadone, heroine, oxycodone, or other opioids[7].

Opioids, particularly heroine and methadone, were the most common cause of deaths due to poisoning and accidental deaths in Norway in 2012-2013[8].

In Iran, one-three cases of death and brain death by poisoning occur every year. The growing rate of addiction, especially among women, in Iran and other countries has increased the incidence of poisoning in the country[9].

MMT has become a popular method of drug rehabilitation in most countries, including Iran.

ince the patient is allowed to take methadone home at some stages of the treatment, families have increasing access to methadone and other drugs. Poisoning with methadone and the consequent hospitalization, negative side effects, and even death in children are mainly caused by parents' negligence in keeping this opioid out of reach. Drug poisoning is responsible for most poisoning deaths. According to Iran Drug and Poison Information Centers, 60%-70% of all poisoning cases are caused by drugs. Accidental ingestion of drugs was the cause of poisoning in 79% of the 52 poisoned children admitted to Mofid Pediatric Hospital (Tehran, Iran) during the past 2.5 years[1,9,10].

Appropriate and timely treatment of methadone poisoning can significantly shorten the hospitalization period and decrease the side effects and deaths in children. Treatment success in poisoning patients widely depends on the time interval between consumption and treatment, which is mostly out of the control of therapists[1,11].

Studies in Iran have shown that determining poisoning patterns can facilitate the early diagnosis of poisoning. In fact, accidental poisoning is generally a result of parents' negligence and poisoning control can reduce the risk of mortality in children[2,11,12,13].

Today, public training is an indispensable part of poisoning prevention[14].

With the increasing rate of methadone poisoning in children and the necessity of immediate nursing care, serious attention needs to be paid to training about the nursing care measures required for children before and after poisoning. Poisoning by drug combinations such as methadone is considered severe and life-threatening in children. This type of poisoning requires long-term treatment with Narcan® (naloxone) and recurrence of poisoning symptoms might be expected upon the discontinuation of the treatment[2,15].

Poisoning in children is a sensitive issue warranting special interventions[5]. Families should be warned about the dangers of methadone for children and asked to keep it securely locked in places out of reach[1].

The growing number of toxic substances and drugs has turned poisoning into a major social issue. Nevertheless, determining different types of poisoning can provide health authorities with a suitable public training model[16].

Accidental drug poisoning is prevalent among boys and girls under the age of five. High rates of drug poisoning have also been reported in teenage girls who are at a higher risk of committing suicide. Families should, hence, be trained about the proper ways of storing drugs at home and the sensitivity of adolescence, especially in girls[6].

The significance of this study lies in the fact that it focuses on nursing care, which has become increasingly important following the growth in poisoning, specifically by methadone, in recent years. The negative side effects and fatality associated with poisoning, as well as the need for immediate care, also highlight the importance of nursing care. Moreover, nurses are the first group of healthcare providers dealing with patients and have to take the primary actions in very limited time. Considering the significance of poisoning prevention, we attempted to facilitate the training of patients under MMT and draw attention to the dangers threatening the lives of their close relatives, especially children, by evaluating patients hospitalized for poisoning and determining the existing statistics. Appropriate and timely nursing care, whether at home or in hospitals, can greatly prevent the physical damages and deaths resulted from poisoning. Although methadone poisoning, even at very low doses, has more severe negative effects on children, previous studies have mostly assessed poisoning symptoms and treatments in adult consumers (rather than children). Moreover, the role of nursing care in recovery from poisoning has not been much investigated, even in adults.

Since specialized nursing care is significantly important in the treatment of poisoning, specific nursing care measures for each patient need to be selected based on the exact type and method of poisoning[17].

The first steps in the treatment of poisoning generally involve the following:

1. Evaluating airway patency;
2. Evaluating breathing rate and quality;
3. Heart rate, blood pressure, and heartbeat regularity measurements; and
4. Prescribing antidotes (e.g. naltrexone, which is an oral opioid antagonist, and naloxone hydrochloride, which is a p ure opioid antagonist and a synthetic congener of oxymorphone) and other required medications (which is the first neces sary measure in some cases)[18].

Poisoned patients are generally in critical conditions and require resuscitation actions including intubation, ventilation, and proper revascularization. Furthermore, all vital signs of the patients must be checked and pulse oximetry and cardiac monitoring should be performed. Naloxone injection is prescribed immediately after blood sampling[19].

Naloxone can counteract the effects of opioids including hypoventilation (respiratory depression), sedation, and hypotension[20].

Absorbent materials, such as clay, cholestyramine powder, and charcoal, can be prescribed to reduce the absorption of the poison by the digestive system. If given within the first hour after poisoning, these materials can be effective in 60% of cases. Otherwise, whole bowel irrigation or gastric lavage has to be performed[21].

Determining a poisoning pattern can facilitate the early diagnosis and management of poisoning and decrease the risk of death[14].

Appropriate and timely treatment of drug poisoning can lead to partial to full recovery. Conversely, failure to provide such treatment will cause irreparable permanent effects, brain death, or even death[22].

Full recovery is achieved if the patient does not show poisoning symptoms 24 hours after taking methadone or six hours after the discontinuation of naloxone infusion[19].

According to previous studies, a better prognosis and fewer side-effects can be expected when the parents or other family members quickly detect the incidence of poisoning and take the poisoned child to an emergency department.

The present study aimed to determine the prognosis of methadone poisoning in children based on the nursing care given in selected hospitals of Isfahan, Iran.

Materials and Methods

This cross-sectional study was conducted in 2014. The research population consisted of all patients poisoned by methadone and hospitalized in the poisoning ward of Noor and Ali Asghar Hospital (Isfahan, Iran) and the emergency department of Imam Hussein Hospital (Isfahan, Iran). All children poisoned by methadone were evaluated and 93 were included through census. The inclusion criteria were age below 15 years, hospital admission due to methadone poisoning, absence of other types of poisoning, and receiving treatment in the mentioned medical centers. Children who were discharged from the hospital out of personal preferences (parental consent) were not included.

Based on available literature, a form was designed by the researchers to evaluate demographic characteristics, medical history, type, method, and cause of poisoning, cases of addiction among close relatives, clinical symptoms, the time interval between getting poisoned and arriving at a hospital or any other medical center (measured and recorded in hours), length of hospital stay, nursing care measures, time and results of nursing care taken, severity of poisoning, and untreated side effects. The severity of poisoning was determined based on neural correlates of consciousness, level of consciousness, respiratory status, oxygen saturation, pulse, blood pressure, skin color, and body temperature, as well as patient's age and consumed dose of methadone (or other accompanying substances). The required information was extracted from patient files and recorded in the designed forms. The collected data were then analyzed and P values less than 0.05 were considered significant.

According to the available statistics, the numbers of children admitted to Noor and Ali Asghar Hospital and Imam Hussein Hospital in 2014 were 49 and 44, respectively.

Results

total of 93 children, aged 11 months to 15 years, were included in the study. Of these, 55 (59.1%) were boys and 38 (40.9%) were girls. Two of the children (2.15%) had a history of addiction with no history of methadone use and 19 (20.4%) had a history of taking anticonvulsants, cold medications, and asthma drugs. One participant had a history of methadone use. Furthermore, four (4.30%) had previous mental diseases and 19 (20.4%) had physical illnesses.

Accidental and moderate-intensity poisoning had the highest frequency among our participants (n = 49, 52.7% and n = 42 patients, 45.7%, respectively) (Table 1).

The mean time interval between poisoning and admission to the emergency department was 7.51 ± 10.60 hours. The 1-12-hour and > 24-hour time intervals had the highest (n = 55, 59.1%) and lowest (n = 1, 1.1%) frequencies, respectively. In other words, the majority of children were taken to the emergency department immediately after poisoning. The participants' mean length of hospital stay was 38.29 ± 41.77 hours. Most children (n = 40, 43.1%) were discharged after 24-72 hours.

Although 55 children (59.1%) had full recovery without any complications, the recovery was accompanied by complications in 12 children (12.9%). Seizures occurred in eight patients (66.7%) and only one case of death (8.3%). The most possible complications of methadone poisoning in children under 15 years of age are seizures and brain death (Figure 1).

Due to the high and frequent ingestion of methadone, a few patients developed drug dependence followed by withdrawal syndrome (i.e. symptoms such as rhinorrhea, drooling, dizziness and drowsiness, loss of appetite, and sleep disorders) after recovery. These cases were categorized in the physiological dependence group.

Vital signs monitoring and consciousness status evaluation were nursing care measures taken for all poisoned children. Cardiac monitoring, naloxone infusion, and oxygen administration were also highly frequent. However, skin and airway examinations had the lowest frequency (Table 2).

In both types of recovery, the frequency of boys was higher than that of girls, i.e. gender did not play a significant role in the recovery status ($P > 0.05$). Likewise, the history of addiction, history of mental diseases, or severity of poisoning did not have significant effects on recovery status ($P > 0.05$). In contrast, physical illnesses and history of medicine use had significant effects on recovery status ($P < 0.05$). In fact, the frequency of patients with physical illnesses or history of medicine use who recovered with complications was significantly higher than that of those who recovered without complications (Table 3).

The frequency of some nursing measures including the administration of the Glasgow Coma Scale (GCS), urinary catheterization, blood tests, urinalysis, electrocardiography, and primary naloxone administration was significantly different between the two types of recovery ($P < 0.05$). In other words, these measures were more frequently used in in complicated recovery cases. The high frequency of such measures in complicated recoveries might be due to the critical conditions of the patients. Therefore, the need for such measures might have been associated with a higher risk of complicated recovery (Table 3).

Discussion

A total of 93 children, including 55 boys (59.1%) and 38 girls (40.9%), were recruited in this study. Children aged 5 years (60 months) had the highest frequency among the participants. Similarly, the mean age of children studied by Manouchehrifar et al[2], was 55 months. In a study by Koushnafar et al[23], 46.6% of the studied children were one-three years old and 60.2% were boys. In a study by Jahanpour[14], 54.7% of the children were boys and most children aged one-five years old. The children studied by Abedini[13], were mostly boys (66.3%). Zare' Fazlollahi et al[6], found the highest frequency of poisoning among children under the age of five (46%). Apparently, children younger than five years of age are the most vulnerable age group to accidental poisoning with methadone. This is due to the innate curiosity of this group of children and the negligence by parents and other care takers.

Our findings showed that two children (2.15%) had a history of addiction without any previous methadone use, 19 (20.4%) had a history of medication use, and one had a history of methadone use. In addition, 6.6% of the poisoned children had addicted parents or relatives. According to Wigen et al[3] in Norway, Hein et al [1] in Germany, and Abedini[13] and Khoda Karim et al[7] in Iran, addiction in patients or their relatives increased access to methadone and raised the risk of poisoning among family members, especially children.

In a study on drug use, Abedini[13], reported methadone as the most commonly used substance (85.5%). Opioids, particularly methadone, were the most common substances used among 201 children studied by Jahanpour[14], Pour Hosseini et al[24], found opium to be responsible for most cases of poisoning in children. Khoda Karim et al[7], identified drug poisoning as the most frequent type of accidental poisoning among children. In 41.3% of cases studied by Besharat et al[25], mothers had given opium and its derivatives to their children. Koushanfar[23], reported drug poisoning, followed by food and plant poisoning, and insect bites and stings, as the most frequent type of poisoning. Based on our findings and the results of previous research, the use of other drugs, psychedelics, sleeping pills, and sedatives simultaneous with the cause of poisoning worsened poisoning symptoms in all cases.

Methods of poisoning were divided into three main categories, i.e. oral, by injection, and unknown, in this study. Most children (89.8%) were poisoned through the ingestion of methadone. Meanwhile, 3.15% of the participants were poisoned by injection. Moreover, the majority of poisoning cases in children (n = 49, 52.7%) were accidental. These results are in line with those reported by Jahanpour[14], and Zare' Fazlollahi et al[6] in Iran, Hin et al[1] in Germany, and Vigen et al[3] in Norway. Poisoning in children is mostly accidental and unintentional and is generally caused by drugs. Intentional poisoning constitutes 30% of the cases and is mainly observed among 12-16-year-old teenagers who get poisoned out of curiosity or in pretended suicides. Intentional poisoning in younger children was caused by parents who had consciously used methadone or other drugs as painkillers or sedatives for their children. They, however, claimed to be unaware of the risks.

All previous studies have only focused on the demographic characteristics of poisoning patients or factors affecting poisoning. This study, however, tried to investigate nursing care measures and their timing as important determinants of poisoning prevention, prognosis, side effects, and recovery in children.

The mean time interval between poisoning and admission to emergency departments was 7.51 ± 10.60 hours, i.e. the majority of children were transferred to medical centers relatively quickly. The shortest and longest time intervals were 20 minutes and 72 hours (three days), respectively. The children's mean length of hospital stay was 38.29 ± 41.77 hours and most patients were hospitalized for five hours.

Abedini[13], concluded that the time interval between poisoning and admission to a medical center was the most important determinant of treatment success. Jahanpour[14], reported the mean length of hospital stay as two days. Moreover, 7.5% of the patients were asymptomatic. Since poisoning is asymptomatic in some cases, providing honest information about the history of addiction in the family and patients' access to drugs, emotional problems, and physical and mental illnesses can help early diagnosis of methadone poisoning in young children.

Based on the above-mentioned facts, the serious side effects of poisoning can be prevented as long as a patient receives appropriate nursing care in a timely manner. Therefore, taking the patient to a medical center as early as possible is a necessity in this regard.

Farnaghi et al[15] and Manouchehrifar et al[2], reported the mean time interval between poisoning and the onset of symptoms as 1.53 hours (which is relatively long). Clinical symptoms of poisoning were described as drowsiness, miosis, vomiting, slow and shallow breathing, and apnea. In this study, vital signs and consciousness monitoring were among the nursing care measures performed for all children. The next most frequent nursing care measures were cardiac monitoring (n = 86, 92.5%),

naloxone infusion (n = 70, 75.3%), and oxygen administration with (n = 60, 64.5%). In other words, these nursing care measures were commonly adopted, especially in cases with complicated recovery. In fact, the critical conditions of some patients necessitated such measures and increased the risk of complicated recovery (Table 3).

Regarding the effects of nursing care measures on children poisoned with methadone, our findings showed a significant difference in terms of primary injection of naloxone between the two types of recovery.

Jahanpour[14], conducted a study on 201 children and reported two deaths. Farnaghi et al[15], calculated the mean length of treatment by naloxone infusion as 51 hours. In 3% of the patients, the symptoms of poisoning were resolved upon the completion of the treatment and discontinuation of naloxone. The group with apnea, however, required a longer course of treatment. Of the 67 children studied by Besharat et al[25], four children under the age of five died because of opium poisoning. Zare' Fazlollahi et al[6], indicated that 2.9% of cases of poisoning in children resulted in death. Moreover, Pour Hosseini et al[24], observed two deaths among the studied children. In a study by Koushanfar et al[23], 86.5% of the cases had mild poisoning and received outpatient treatment. Meanwhile, 13.5% of the children were hospitalized due to severe poisoning and three patients died.

In this study, 59.1% of the children with methadone poisoning recovered without any side effects. However, 12 children (12.9%) experienced a complicated recovery. The most and least frequent complications were seizure (n = 8, 66.7%) and death (n = 1, 8.3%). Despite the attempts of the medical staff, one death and two brain deaths occurred due to methadone poisoning. Young age of the patients, high doses of methadone, simultaneous use of other drugs, underlying diseases, and delayed transfer of the patients to the medical centers might have been responsible for these cases.

After primary care and partial recovery, 28% of the patients were discharged under personal consent by parents. These patients were excluded from the final analyses due to unknown treatment outcomes. Finally, 59.1% of the children were discharged after full uncomplicated recovery.

According to the findings of this study and similar research, early transfer of the patients to medical centers, along with timely and appropriate nursing care measures (especially well-timed injection of naloxone), will result in milder symptoms, better prognosis, and, thus, better treatment and recovery for patients of any age and conditions. They can also reduce the irreparable side effects of poisoning in innocent children.

Conclusion

Research in this field indicates that a limited number of poisoning cases leads to death. Nevertheless, obtaining a full medical history of the patient (including how the patient got poisoned) and honest information about the real cause of poisoning, early transfer of the poisoned child to a medical center (timely contact with emergency services), and provision of timely and appropriate care, especially immediate use of antidotes, by the clinical staff can further reduce the number of poisoning deaths.

References

1. Kozłowski C. UV radiation emitted by selected sources at work stands. International journal of occupational medicine and environmental health. 2001;14(3):287-92.
2. Davies K, Asana U, Nku C, Osim E. Ocular effects of chronic exposure to welding light on calabar welders. Nigerian Journal of Physiological Sciences. 2007;22(1-2).
3. Van Kuijk F. Effects of ultraviolet light on the eye: role of protective glasses. Environmental health perspectives. 1991;96:177.
4. Heydarian S, Mahjoob M, Gholami A, Veysi S, Mohammadi M. Prevalence of color vision deficiency among arc welders. Journal of optometry. 2016.
5. Iyiade AA, Omotoye OJ. Pattern of eye diseases among welders in a Nigeria community. African health sciences. 2012;12(2):210-6.
6. Fich M, Dahl H, Fledelius H, Tinning S. Maculopathy caused by welding arcs. Acta ophthalmologica. 1993;71(3):402-4.
7. McCarty C, Taylor H. A review of the epidemiologic evidence linking ultraviolet radiation and cataracts. Progress in lens and cataract research. 35: Karger Publishers; 2002. p. 21-31.
8. Sliney DH. How light reaches the eye and its components. International Journal of Toxicology. 2002;21(6):501-9.
9. Yu Z, Schulmeister K, Talebizadeh N, Kronschläger M, Söderberg P. Temperature-controlled in vivo ocular exposure to 1090-nm radiation suggests that near-infrared radiation cataract is thermally induced. Journal of biomedical optics. 2015;20(1):015003-.

10. Erhabor G, Fatusi A, Ndububa D. Pulmonary symptoms and functions in Gas welders in Ile Ife. Nig Med Pract. 1992;24(5/6):99-101.
11. Slagor RM, La Cour M, Bonde JP. The risk of cataract in relation to metal arc welding. Scandinavian journal of work, environment & health. 2016;42(5):447-53.
12. Doughty MJ, Oblak E. A clinical assessment of the anterior eye in arc welders. Clinical and Experimental Optometry. 2005;88(6):387-95.
13. Megbele Y, Lam K, Sadhra S. Risks of cataract in Nigerian metal arc welders. Occupational medicine. 2012;62(5):331-6.
14. Zamanian Z, Mortazavi SMJ, Asmand E, Nikeghbal K. Assessment of Health Consequences of Steel Industry Welders' Occupational Exposure to Ultraviolet Radiation. International journal of preventive medicine. 2015;6.
15. Asbell PA, Dualan I, Mindel J, Brocks D, Ahmad M, Epstein S. Age-related cataract. The Lancet. 2005;365(9459):599-609.
16. Ashaye A. Pterygium in Ibadan. West African journal of medicine. 1990;10(3-4):232-43.
17. Alakija W. Eye morbidity among welders in Benin City, Nigeria. Public Health. 1988;102(4):381-4.
18. Okoye O, Umeh R. Eye health of industrial workers in Southeastern Nigeria. West African journal of medicine. 2001;21(2):132-7.

Table 1. Frequency distribution of methods and severity of poisoning in children poisoned with methadone

Poisoning	Category	Frequency	Percentage
Method of poisoned	Intentional	10	10.8%
	Accidental	49	52.7%
	Overdose	6	6.5%
	Unintentional	19	20.4%
	Unknown	9	9.7%
Severity of poisoning	High	13	14%
	Moderate	42	45.7%
	Low	38	40.9%

Table 2. Frequency distribution of nursing care measures taken for children poisoned with methadone

Nursing care measures	Frequency	Percentage	Nursing care measures	Frequency	Percentage
Vital signs monitoring	93	100%	Blood test	55	59.1%
Consciousness status monitoring	93	100%	Urinalysis	20	21.5%
Oxygen administration	60	64.5%	Psychological consultation	13	14%
Airway evaluation	6	6.5%	Urinary catheterization	10	10.8%
Skin examination	4	4.3%	Nasogastric intubation and gastric lavage	9	9.7%
Naloxone injection	50	53.7%	Cardiac monitoring	86	92.5%
Naloxone infusion	70	75.3%	Electrocardiography	15	16.1%
Naltrexone	9	9.7%	Administration of the Glasgow Coma Scale	15	16.1%

*** More than one nursing care measures might have been taken for each patient.**

Table 3. Factors affecting recovery in children poisoned with methadone

Factors		Recovery status		P
		Uncomplicated (n = 55)	**Complicated (n = 12)**	
Age		4.56 ± 3.68	3.15 ± 2.77	0.215
Gender	**Male**	36 (65.5%)	7 (58.3%)	0.743

	Female	19 (34.5%)	5 (41.7%)	
History of addiction	**None**	46 (83.6%)	7 (58.3%)	0.93
	The patient	1 (1.8%)	0 (0%)	
	The patient's family members	8 (14.5%)	5 (41.7%)	
Mental diseases		1 (2.2%)	1 (1.1%)	0.303
Physical illnesses		7 (12.7%)	6 (50%)	0.008
Previous medications		4 (7.3%)	5 (41.7%)	0.007
Severity of poisoning	**Low**	26 (47.3%)	4 (33.3%)	0.283
	Moderate	24 (43.6%)	5 (41.7%)	
	High	5 (9.1%)	3 (25%)	
Airway evaluation		1 (8.3%)	1 (1.8%)	0.328
Oxygen administration		38 (69.1%)	7 (58.3%)	0.510
Administration of the Glasgow Coma Scale		6 (11.1%)	5 (41.7%)	0.022
Skin examination		2 (3.6%)	0 (0%)	0.944
Nasogastric intubation and gastric lavage		4 (7.3%)	2 (16.7%)	0.291
Urinary catheterization		2 (3.6%)	5 (41.7%)	0.001
Blood test		29 (52.7%)	10 (83.3%)	0.049

Urinalysis	11 (20%)	6 (50%)	0.049
Cardiac monitoring	50 (90.9%)	11 (91.7%)	0.934
Electrocardiography	3 (5.5%)	8 (66.7%)	< 0.001
Primary naloxone administration	27 (49.1%)	10 (83.3%)	0.031
Naloxone infusion	40 (72.7%)	11 (91.7%)	0.054
Naltrexone administration	8 (1.8%)	0 (0%)	0.333

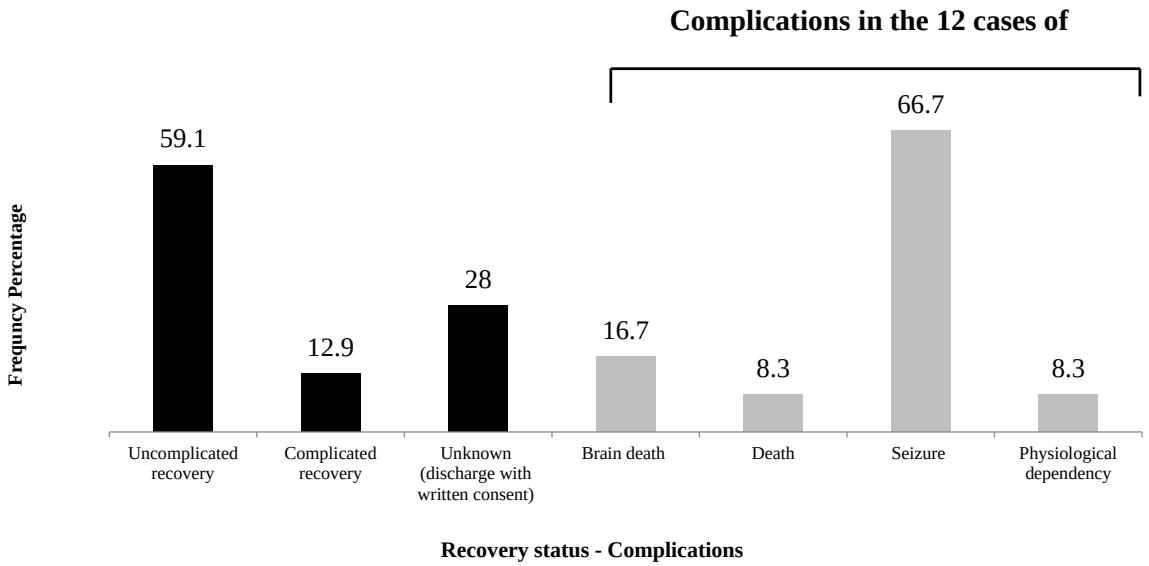

Figure 1. Frequency distribution of recovery status in children poisoned with methadone