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Methadone Poisoning in Children and some Factors affecting it: A Cross-sectional Study in Tabriz, Northwest of Iran

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Abstract

Introduction

Children may be intentionally or unintentionally exposed to any substance. Substance poisoning is one of the most important emergency interventions in children that cause a great number of deaths each year. Regarding the importance of this issue and recent increase in number of poisoning cases, a study with the aim of investigating cases of substance poisoning and factors involved in emerging them was carried out in Children Hospital of Tabriz.

Materials and Methods

The present descriptive cross-sectional study was carried out on hospitalized children with substance poisoning diagnosis during two years. The data was collected through referring to patients' case and using demographic information questionnaire and symptoms checklist. The data was analyzed using SPSS-13, descriptive statistics, t- test, chi- square and spearman tests.

Results

During two years, 97 children with the mean age of 48.6 ± 32.3 months were hospitalized due to substance poisoning. 59.3% of the study population consisted of boys and 40.7% of girls. Drowsiness, decreased level of consciousness, vomiting and pin point pupil were the most common symptoms recorded in children. The relationship between the type of substance and parents' addiction was statistically significant ($P < 0.05$). There was no significant relationship between intentional and unintentional poisoning and parents' addiction ($P > 0.05$).

Conclusion

Non-specific package, unsafe keeping, and shortage of people's knowledge are among the most important factors involved in methadone poisoning in children. Delivering clear information about the fatal effect of this drug on children by health- care personnel especially doctors seems be necessary.

Key Words: Children, Poisoning, Substances, Methadone.

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Introduction

Poisoning is one of the most important problems which may occur during childhood. In many high-income countries, poisoning is the fourth reason of children's death which makes 45 thousand children and teenagers under twenty years of age die each year(1). In fact, due to increasing rate of addiction in society, the number of children poisoned by these type of substances is increasing as well (2). In the U.S.A, prescribing edible substances is the most important reason for under-6-year-old children to be hospitalized due to poisoning (3). The way of consuming substance and poisoning patterns are constantly changing and day to day various new compound drugs become available for people. Methadone is one of the most common compounds used by people(4), as from 2000 to 2008; the centers of controlling poisoning in the U.S.A reported 2,186 cases of exposing methadone by under-6-year-old children which in turn had brought about the death of 20 kids(5). Methadone is a synthetic opioid with high pain-killing effect and long half life between 25 to 52 hours (6). In 1 ml of methadone syrup, there is 5 mg methadone and the dose of 1 mg/kg can lead to harmful poisoning, apnea and death (7).

Children are exposed to methadone either unintentionally in families who use this drug illegally or intentionally by their caregivers (8, 9). Methadone poisoning may be caused due to unsafe keeping at home or its appealing taste when blended with fruit juice. Besides, unawareness about poisoning effect of the drug and having children take it to pacify them are some of risk factors for being poisoned (10). It seems that in a conscious status, mistreating children is not only related to using drugs by parents, but also to other factors such as mother's psychopathology, parents' behavior, family environment

including couple's relationship and having access to supportive systems as well as socio-economic factors such as unemployment and poverty(11). The symptoms of methadone poisoning include decreased level of consciousness, respiratory distress syndrome and finally death. The primitive symptoms in children include vomiting, lethargy and drowsiness which lead to apnea while sleeping and death in case they are not cured (4). The death resulted from overdosing opioids is often because of respiratory distress syndrome and decreasing patient's sensitivity to hypoxia and hypercarbia with apnea (12).

In children under 6 years of age, even the smallest amount of methadone can result in dangerous symptoms (13). Therefore, even the empty container of methadone syrup which contains a small amount of methadone can be potentially high-risk for children (14). Since substance abuse is the reason for more than half of the poisonings (2), paying close attention to this issue is of a great importance. According to a report from a study carried out in 2013 in Tehran, the major number of poisonings in children was due to substance consumption (1). Several studies in different areas of the country have also reported the increasing number of poisoning with substance, as in some areas, substance poisoning was the reason for 91% of children's death (15). Increasing substance abuse in society has made it easy for children to access substance (13). Tabriz Children Hospital is the only referring center for children in East Azerbaijan and neighboring vicinities (16) and studies carried out in this region represent the current condition all around East Azerbaijan and its vicinities. Regarding this issue and its importance on children's health, a study seems necessary to be done in this center with the aim of investigating cases of substance poisoning and involved factors; therefore, through

describing current condition, involved factors will be recognized and appropriate policies on preventive plans and on-time actions will be established.

Materials and Methods

In this descriptive cross-sectional study the children hospitalized at Children Hospital in Tabriz-Iran, due to substance poisoning were studied by convenient sampling from April 2012 to April 2014. The data was collected by children and family demographic questionnaire (age, gender, family structure, number of family members, parents' addiction) and checklist of signs and symptoms (sign and symptom of poisoning, type of the substance, intentional poisoning, events and hospitalization period and outcomes). After obtaining permission from the authorities of children's hospital and obtaining the consent of the parents to participate in the study, child and family demographic questionnaire completed by parents. Information about signs and symptoms was also completed through referring to patient's case by a researcher. The data was analyzed using SPSS software, version 13. The descriptive statistics including number, percentage, mean and Standard deviation (SD) were used to investigate personal-social characteristics of children and their family and to report signs and symptoms of poisoning. To describe the relationship between qualitative and quantitative variables of the study, T- test, Chi- square and Spearman tests were used.

Results

During the period of study, 97 children with substance poisoning diagnosis were hospitalized in Children Hospital of Tabriz. 59.3% of the population consisted of boys and 40.7% of girls. The mean and SD age of hospitalized children was 48.6 ± 32.3 . The youngest child was 1 month and

the oldest one was 13 years of age. 97% of children were under their parents' support. The number of family members has been outlined in Table.1. 30.9% of fathers and 3.1% of mothers of the children were addicted to substance.

87.5% of children were hospitalized due to methadone poisoning, 4.2% were poisoned with opium and 8.4% with other types of substances. 20.2% of children were poisoned intentionally. The mean of hospitalization period was 2.45 ± 2.89 days. 7.3% of the children were under mechanical ventilation during hospitalization and the longest period of intubation was 3 days. The signs and symptoms of poisoning in children have been outlined in Table. 2.

As it is shown in (Table.2), drowsiness and loss of consciousness are the most common symptoms recorded in children. Symptoms such as hallucination, trembling, rigidity, fever, paleness and itching were recorded in only 1% of children. One of the children had some bruise and another one had some burns on their body. Also, one of the children had cardio respiratory arrest which led to her death. Other hospitalized children were discharged from the hospital. Based on the results from chi- square test, the relationship between type of the drug and parents' addiction was statistically significant ($P < 0.05$).

There was no significant relationship between gender and age and reported symptoms in children. Although based on chi-square test there was no significant relationship between intentional and unintentional poisoning and parents' addiction, the rate of intentional poisoning was higher in children with addicted parents ($P > 0.05$). Based on the results from chi-square test, no significant relationship was identified between age and period of hospitalization ($P > 0.05$). Also, the results from Spearman test did

not approve the relationship between period of hospitalization and number of

family members and type of drug and symptoms in children ($P > 0.05$).

Table 1: Number of hospitalized children's family members

Number of family members	Number	(%)
2 persons	4	2.3
3 persons	39	41.9
4 persons	34	36
5 persons and more	20	19.8
Total	97	100

Table 2: Signs and symptoms of poisoning in children

Signs	Number	(%)*
Drowsiness	60	61.9
Loss of consciousness	35	36.4
Vomiting	30	30.9
Pin point pupils	29	29.9
Cyanosis	22	22.7
Ataxia	14	14.4
Dizziness	8	8.2
Lethargy	7	7.4
Apnea	6	6.2
Hypotonia	5	5.2
Malaise	4	4.1
Respiratory distress	4	4.1
Headache	2	2.1
Convulsion	2	2.1

* Some children had more than one sign

Discussion

Methadone is a synthetic and long lasting opioid that its consumption and related causes of death have been growing recently. After popularity of alternative treatment with methadone in Iran, which started from 2004 and grew gradually, this

dangerous substance entered home environment unsafely and led to accidental expose by the children and finally their death(4). Unfortunately overlooking safety actions on methadone consumption in Iran has made the danger of methadone poisoning to be a serious threat for children. In present study, which was

carried out during 24 months, 97 children were hospitalized in children's intensive care unit due to substance poisoning of which 87.5% were related to methadone poisoning. Regarding family features, 97% of children were under their parents' support. The mean age of hospitalized children was 48.6 months (about 4 years of age). Considering sex distribution, the greatest portion was for boys with the percentage of 59.3. In Jabbehdari's study(17) carried out in 2011 in Loqman Hakim hospital in Tehran, the mean age of children was the same as our study while the percentage of sex distribution was almost equal in that study. The poisoning diagnosis is based on history and physical examination. The physician should make effort to identify the specific drug, dose and history of previous consumption of substances (18).

The most common symptoms recorded in this study were drowsiness, loss of consciousness, vomiting and pin point pupils respectively which were in accordance with Jabbehdari et al. study in which drowsiness was reported as the most common symptom. Vomiting was also a common finding in both studies. Although in our study no significant relationship was found between age and gender and common symptoms, the accordance between common symptoms in our study and Jabbehdari's study might be as the result of mean age similarity between the two studies. In a study by Zamani (19), miotic pupils(90%) and decreased level of consciousness were the most common symptoms respectively. In Farnaghi's study (4) in 62% of cases, classic triad of substance poisoning (decreased level of consciousness, miotic pupils and respiratory distress syndrome) were reported. Zamani et al. clarified that the most beneficial index for diagnosing substance poisoning in infants and toddlers was miosis accompanied by decreased level of consciousness. In newborns,

convulsion was the most common finding. In our study, some less common symptoms such as hallucination, trembling, rigidity, fever, paleness and itching were found and in Faranghi's study similar symptoms such as delirium and itching were reported as well. In case poisoning with higher dose of substance is diagnosed in infants or kids, experienced staff should consider the probability of intentional poisoning by the caregivers (18).

Most of the poisoning cases in our study were accidental; however, in 20% of cases, children were poisoned by their parents intentionally. Substance abuse among children with one or two addicted parent is growing worldwide (11). Although in present study 30.9% of fathers and 3.1% of mothers were addicted to substance and the rate of intentional substance poisoning was higher among children with addicted parents, there was no significant relationship between intentional poisoning and parents' addiction. Based on present literature, in accidental cases, giving not enough information to addicted parents by the doctor who prescribes methadone about the fatal effect of this substance on children and how to keep it, lead to children's poisoning (20).

As shown in the results of studies (17, 21, 22), in children under 12 years of age, the most cases of poisonings were because of mistaking methadone syrup for anti cough syrup or water. In Dupuy's study, ignoring empty container of methadone (which contains a little amount of methadone) has been reported as the reason for accidental poisoning in children. On the contrary, Besharat's study (2) showed that in 41.3% of cases, substance poisoning was intentional and by the mothers. The reason was geographical condition of Golestan vicinity and common use of opium and its derivatives to pacify the children. Low level of educational attainments (80% high school education) and living in rural areas (61.2%), which affected parents'

awareness, were among involving factors. Other studies showed that in older children, the most cases of intentional poisonings were among teenagers with suicidal intentions in which Methadone pills were used instead of syrup (21). A notable issue about methadone poisoning is the delayed onset of symptoms which justifies longer course of treatment (4). In several studies prolonging the symptoms from 12 hours to 3 days has been reported (12).

In our study, the mean period of children's hospitalization was 2.45 days and it was similar to Martin's study in which the mean period was 2.3 days. 7.3% of children in present study needed intubation and only one case of death occurred due to cardio respiratory arrest while in the study by Martin et al which was carried out during 10 years in the USA, 18% of children needed intubation but no case of death was reported which was probably because of proper management and standardized cares in America compared with Iran. Although in other studies in the U.S.A (23) some cases of death were reported, most of these cases were before admission in the hospital. Therefore, it seems that taking the methadone poisoned child to the hospital on time increases surviving opportunity (13). In the study by Besharat et al. 4 out of 67 cases of poisonings ended up in death which was probably because of much more amount of intentional substance consumption by the mothers and not on time admission in the hospital.

The limitation of this study was that the reports by the parents about the reason of poisoning were probably incorrect, because of their fear of probable outcomes and it might have affected the accuracy of the data on intentional or accidental poisoning.

Conclusion

Increasing trend in methadone consumption as an alternative treatment, non-specific package, unsafe keeping at home and shortage of people's knowledge about fatal effect of this drug on children, have made it possible for children to access this substance accidentally or intentionally which endangers their lives. Therefore, clear information about methadone and its fatal effects on children even in little amount, seems be necessary to be delivered to the parents by the healthcare personnel and the physicians who prescribe this drug.

Conflict of interest: None.

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