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# Frequency, Etiology and Several Socio-demographic Characteristics of Acute Poisoning in Children Treated in the Intensive Care Unit

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## ORIGINAL PAPER

### SUMMARY

**Aim:** The aim of this work has been to present the frequency, etiology and several other socio-demographic characteristics of acute poisoning in children. **The treated patients and methods of work:** The treated patients were children of all age groups hospitalized in the Pediatric Clinic of Prishtina during year 2009. The study was done retrospectively. The diagnosis was done on the basis of heteroanamnesis and in several cases on the basis of the anamnesis data of a child, routine laboratory tests and toxicologic analysis. **Results:** 66 (9.4%) poisoned children were treated in the Intensive Care Unit. The biggest number of patients, 37 (56.06%) of them, were male, and out of that number 36 (54.55%) cases were coming from rural areas. The biggest number of them 49 (74.98%) were over 2-6 years old. The poisoning was mostly caused through the digestive tract (ingestion), it happened with 55 cases (83.33%), 56 cases (84.80%) suffered from severe poisoning, whereas 59 cases (89.50%) suffered from accidental poisoning. Regarding the type of the substances that caused poisoning, the most frequent were drugs in 34 (51.50%) cases and pesticides in 20 (30.30%) cases. Among drugs, the most dominant were those belonging to a group of benzodiazepines (10 cases) and metoclopramide (4 cases). Among pesticides the most dominant one that caused poisoning was malation (5 cases), then paration and cipermetrina appeared in 3 cases each. The biggest number of cases, 64 (96.96%) of them, were treated, whereas 2 cases (3.40%) passed away. **Conclusion:** The practice proved that that our people are not well informed about the poisoning in general, therefore it is necessary that they be educated by the use of all media, written and electronic, as well as other methods of medical education.

**Key words:** Poisoning, types and socio-demographic data.

## 1. INTRODUCTION

Due to fast industrialization and the urban way of living, more frequent usage of drugs, vast usage of chemical materials in households and agrotechnic materials in the villages children are more exposed to the chemical agents and as such they are the potential causes of poisoning which before were not that frequent (1, 2, 3, 4, 5, 6, 7). And due to the increase of population in the big cities, the natural surrounding became unknown to a child, who now is in the urban surrounding and is continuously exposed to a large number of potential toxic substances (8, 9, 10, 11, 12).

The risk of poisoning is also increased due to the fact that both parents may be employed, they are not present

during the day at home, they do not show enough of care for their child and the society in general (13, 14).

The poisons are considered to be all substances which in any way of entering the body by a chemical reaction disorientate the anatomic and functional structure of tissues and organs. The reactions of the unwanted substances which entered the body depend on several factors: dose, concentration, manner of usage, speed of absorption of toxic substance, speed of clinical manifestations, the child's age and general condition of a child. According to the reports of WHO, acute poisonings are on the forth place of the lists of morbidity and mortality of children (2, 4, 10, 15, 16, 17, 18).

## 2. AIM

The aim of this work was the presentation of the frequency, etiology and several socio-demographic characteristics of acute poisoning in our treated patients.

## 3. THE TREATED PATIENTS

The patients were children belonging to all age groups treated in the Intensive Care Unit in the Pediatric Clinic of Prishtina during 2009. Diagnosis of acute poisoning was done on the basis of the anamnesis, clinical examination, laboratory data and toxicological analyzes.

## 4. RESULTS

During 2009 year, 679 children were treated from the various diseases in the Intensive Care Unit. 66 cases (9.7%) suffered from different types of poisoning occupying the fourth place in the list regarding the frequency as a cause of hospitalization of those children in this Unit (Table 1). The total number of children hospitalized in the Clinic was 3462, 1.90% of the mentioned number was hospitalized due to acute poisoning.

Systematic chart of the diseases	Number	%
Diarrhoea ac. Infectiosa	196	29.8
Bronchopneumonia decompensata	187	27.7
Convulsions	72	10.7
Acute poisonings	66	9.7
Obstructive respiratory disease	46	7.0
Heart diseases	28	4.2
Sepsis	19	2.9
Intracranial acute infection	12	1.8
Blood diseases	9	1.3
Status epilepticus	8	1.2
Acute kidney failure	3	0.45
Diabetic ketoacidosis	1	0.15
Polyradiculoneuritis	1	0.15
M. Werdnig-Hoffmann	1	0.15
Osteogenesis imperfect	1	0.15
Submersion	1	0.15
Total	679	100.0

Table 1. Structure of morbidity of children hospitalized in the Intensive Care Unit

Regarding the gender, place of residence, age and the place of poisoning (Table 2), it is obvious that regarding the gender 37 cases (56.06%) were male, whereas 29 (43.93%) cases were female. Regarding the place of residence, 36 (56.06%) cases were coming from the rural areas, whereas 30 (45.45%) cases were coming from the urban areas. Regarding the age of the poisoned children, the largest number 49 (74.98%) cases belong to the age group 2–6 years, then 11 cases (16.66%) belong to the age group of 7–18, and 6 (9.09%) belong to the group of infants. Regarding the place of poisoning, the largest number of poisoning occurred at home i.e. 52 (78.78%) of cases, whereas outside the house 14 (21.12%) cases.

Regarding the manner of poisoning (table 3), majority of them 55 (83.31%) got poisoned through the digestive track (ingestion), then through skin 9 (13.63%) cases, respiratory tract (inhalation and through the nose mucosa) 2 (3.04%) cases.

Parameters	Number	%
Gender:		
Male	37	56.06
Female	29	43.94
Place of residence:		
Urban	30	45.45
Rural	36	54.55
Age:		
Infants	6	9.09
2-6 years old	49	74.98
7-18 years old	11	16.66
Place of poisoning:		
At home	52	78.78
Outside	14	21.12

Table 2. Classification of poisoned children according to the gender, place of residence, age and place of poisoning

Manner	Number	%
Digestive tract (Ingestion)	55	83.33
Skin	9	13.63
Respiratory tract (inhalation and nose mucosa)	2	3.04
Total	66	100

Table 3. Manner of poisoning

Majority of poisoning on the basis of the presence of clinical manifestations were severe, 56 (84.80%) cases, whereas the mild 10 (15.205) cases (Table 4).

Classification	Number	%
Severe	56	84.80
Mild	10	15.20
Total	66	100

Table 4. Clinical classification of poisoning on the basis of the clinical manifestations

Majority of cases, 59 (89.50%) of them, were poisoned accidentally, 3 cases (4.50%) attempted suicide and in 4 cases (6.00%) the reason of poisoning is unknown (Table 5).

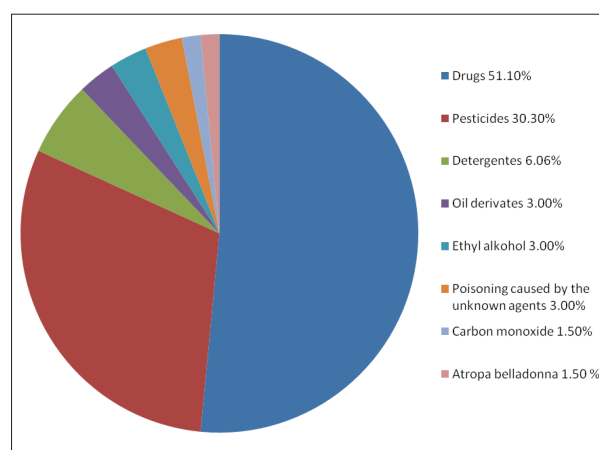


Chart 1. Types of poisoning substances

Reason	Number	%
Accidental	59	89.50
Suicide attempt (parasuicide)	3	4.50
Reason-unknown	4	6.00
Total	66	100

Table 5. Reason of poisoning

Types of poisoning substances were presented on the Chart 1. The drugs are on the first place, in 34 (51.50%) cases, followed by the pesticides in 20 (30.30%) cases, then detergents in 4 (6.06%) cases, oil derivatives, ethyl alcohol each in 2 (3.00%) cases, the type of poisoning was not identified in two cases, whereas poisoning with carbon monoxide and atropa belladonna occurred in one case each.

The following table (Table 6) contains the groups of drugs and their brand names. It is obvious that from the total number of 34 children poisoned with drugs, the first place occupy the poisoning caused by benzodiazepines (10 cases), then metoclopramide (5 cases) and then two or one case with the other drugs. The drugs that caused poisoning in two cases remained unknown.

Groups of drugs and generic names	Brand name	Number
Benzodiazepines	Bensedin <sup>®</sup> , Atarax <sup>®</sup>	10
Metoclopramide	Reglan <sup>®</sup> , Klometol <sup>®</sup>	5
Neuroleptic drugs	Largaktil <sup>®</sup> , Nozinan <sup>®</sup>	2
Tricyclic antidepressants	Eupramin <sup>®</sup>	2
Unidentified drugs		2
Digoxine	Dilacor <sup>®</sup>	2
Antiarrhythmic drugs	Verapamil <sup>®</sup>	1
Iron preparates	Legofer <sup>®</sup>	1
Acidum acetyl salicylicum	Andol <sup>®</sup>	1
Barbiturates	Phenobarbiton <sup>®</sup>	1
Meprobamate	Tegretol <sup>®</sup>	1
Isoniazid	Eutizon B <sub>6</sub> <sup>®</sup>	1
Nasal decongestants	Adrianol T <sup>®</sup>	1
Theophylline	Aminophylline <sup>®</sup>	1
Total		31

Table 6. Groups of drugs and their names regarding the drugs poisoning

Number of patients poisoned with the pesticides reached 20. Table 7 presents types of the pesticides (insecticides and rodenticides) and also their generic names. As it is evident the largest number of poisoning (5 cases) was with Malation (Ethiol<sup>®</sup>), followed by Paration (Zimotax<sup>®</sup>) and Cipermetrin (Fastac<sup>®</sup>), whereas the same number of cases was caused (one case) by Dimetoat (Sistem E<sub>40</sub><sup>®</sup>), Imidakoprida (Confidor<sup>®</sup>), Fipronil (Regent<sup>®</sup>) and Varvarin (Antikolin<sup>®</sup>). There was no documentations regarding the acceptance and hospitalization of 4 patients.

Generic name	Brand name	Type	Number
Malation	Ethiol <sup>®</sup>	Organophosphates	5
Paration	Zimotax <sup>®</sup>	Organophosphates	3
Cipermetrin	Cipkord 20 EC <sup>®</sup>	Organophosphates	3
Alfa Cipermetrin	Fastac <sup>®</sup>	Organophosphates	2
Dimetoat	Sistem E <sub>40</sub> <sup>®</sup>	Organophosphates	1
Imidakoprida	Confidor <sup>®</sup>	Carbamate	1
Fipronil	Regent <sup>®</sup>	Carbamate	1
Varvarin	Antikolin <sup>®</sup>	Rhodenticides	1
Do not possess any documentation			4
Total			20

Table 7. Poisoning with pesticides (generic name, brand name and type)

Regarding the prognosis of the patients with an acute poisoning, as shown on the Table 8, 64 (96.96%) cases recovered, whereas 2 (3.40%) passed away.

Prognosis	Number	%
Recovered	64	96.96%
Passed away	2	3.40
Total	66	100

Table 8. Prognosis of acute poisoning

## 5. DISCUSSION

Acute poisoning in patients appears often (9.7%) in the Intensive Care Unit, whereas in comparison with the total number of hospitalized children it is 1.90%. According to Mandić (21) during the period of five years 402 (3%) children were hospitalized due to the acute poisoning. According to Groždanovska et al. (12) the percentage of children hospitalized due to the acute poisoning reaches 2%. The highest percentage (2.48%) of acute poisoning was registered in children treated at the Pediatric Clinic in Split (22).

The highest percentage of cases (56.66%) were male probably as a result of the higher activity of male children and other unknown causes. In the work of Nabeel Manzar et al. (1) the balance between male and female was 1.2:1. According to Beautrice Al. et al. (7) the balance between male and female was 1.8:1.

In our study 36 (54.55%) cases were from the rural areas, due to the lower health education of the population in the rural areas (keeping the drugs in inappropriate places) and wide usage of pesticides in agriculture. Also the other authors from the region (20, 21, 22) registered that the percentage of poisoned children in rural areas was higher than the percentage of poisoned children in urban areas.

The largest number, 49 (74.98%) cases, of poisoning belonged to the age group of 2-6 years. At this age, the child's ability to move independently and its contact with object around him/her, research of the surroundings not only through eyes, but also through touch and taste without being aware of the risk that may arise from objects around them. According to Nabeel Manzar et al. (1), 66% out of 100 cases with poisoning belong to the age group 2-6 years. The lower percentage (53.3%) of this age group was registered by Rfidal El et al. (8) in 130 children with acute poisoning. According to the authors (22) 54.6% of cases belonging to the age group 2-5 years out of the total number of 227 cases suffered from the acute poisoning.

The digestive track (ingestion) was the most common way of poisoning in 53 (83.33%) cases. Also according to author Nabeel Manzar et al. (1), 100 children suffered from the acute poisoning that they received through digestive track in 76% of cases. Maksimović et al. (23) proved that the most common way of poisoning (80%) in patients was through the digestive tract.

Unfortunately, majority of researches (84.80%) done on the basis of the clinical manifestations were severe in our patients, in the majority of our cases the disease was characterized by vomiting, dyspnea, irritability, somnolence, mydriasis, miosis (depending on the type of the

poisoning substance) etc. These severe clinical manifestations depend on the doses, manner of usage and time period of medical assistance, which in all our cases were of a long time period. According to Shakya et al. (5) 65% cases suffered from serious poisoning. Andrian N. et al. (6) registered 61.2% of cases with severe acute poisoning. According to H. Tahirović et al. (9), 45.2% of poisoned children suffered from severe clinical manifestations, whereas the highest percentage (54.8%) of cases suffered from mild clinical manifestations.

Regarding the aim of poisoning, in majority of patients 59 (89.50%) it was caused accidentally. However, on the basis of the anamnesis data (of a child) and heteroanamnesis the reason of poisoning is unknown in 4 cases (6.00%). Attempted suicide with poisoning was confirmed in 3 cases (4.50%). This happened among children in puberty (in connection with the psychosocial issues in that period of life). According to Rfidal El et al. (8), 95% cases of poisoning were accidental, whereas 5% was suicide attempt.

In our study 34 (51.50%) cases suffered from poisoning with drugs, they are followed by poisoning with pesticides 20 (30.30%) cases, then poisoning with detergents 4 (6.06%) cases. In two cases, the type of poisoning was not identified. According to the results of Matana M. et al. (22) the most frequent poisoning occurred with the drugs (54.6%), then with alcohols, oil derivatives, detergents etc. Robert et al. (11) determined that the drugs (65%) occupy the first place as the cause of acute poisoning in children, they are followed by detergents (22%). According to the results of Lo Groon et al. (19) 50% of poisoning was caused by drugs, then 29.1% with alcohol, 2.77% with detergents, whereas 1% with pesticides, which is in comparison with our results much lower in percentage. According to Nabeel Manzar et al. (1) the most frequent causes of the poisoning were oil derivatives (50%), then drugs (38%), pesticides (7%) and detergents (5%). Regarding the types of poisoning according to the results of the authors from the region (9, 21, 22, 23) the drugs occupy the first place, then alcohol, detergents, oil derivatives, whereas according to our results the second place occupy pesticides (20%), and alcohol on the fifth place 2 (3.00%).

In our results, the benzodiazepines are on the first place of the types of the drugs causing poisoning (10 cases), then metoclopramides (5 cases), neuroleptic drugs (2 cases), tricyclic antidepressants (2 cases), digoxine (2 cases) and at 2 cases poison substance was not identified. In the results of authors O'Connor P. et al. (16, 17) and Kiely T. et al. (15) the benzodiazepines occupy the first place of drugs as the causes of poisoning, then follow the digoxine and antidepressants. These groups of drugs are now-days widely used by the members of the family and they are not kept in the proper places.

Pesticides as the cause of poisoning occupy the second place with 20 (30.30%) cases. The most frequent poisoning was with Malation (5 cases), with Paration and Cipermetrin 3 cases each. They are widely used in agriculture (and they are not kept away from the contact of children during the summer) and at home where unfortunately still due to low health education are used for antiscabies

treatment and cleansing of the hair from pediculosis, but also through the digestive tract accidentally or with the suicide attempts. In the results of the authors from the region (9, 12, 21, 22, 23) pesticides as the cause of poisoning are positioned on the third and the fourth place.

The prognosis of the children with acute poisoning has been acceptable. From the total number of 66 cases, 2 (3.04%) cases passed away. The first case that passed away got poisoned with the organophosphoric insecticide (Paration) and the child was treated for 12 hours in the Emergency Center, at the moment of entering the Pediatric Clinic the child was in coma. Despite the fact that child was given the big doses of antidotes (atropine and pralidoxime) the child passed away after being hospitalized. The second case that passed away was poisoned with Carbamazepine (Tegretol<sup>®</sup>), child accidentally had taken approximately 17 tablets (her mother was using them daily for treatment of epilepsy). The child was admitted too late in the Clinic, with toxic signs of over dosage of the drug: midriasis, ataxia, hypotension, seizures than later comma and apnea. Despite very intensive treatment the child passed away six hours after admission. Our results regarding the mortality rate of poisoned children are similar and yet different as well with those of other authors. According to Geoffrey Al. et al. (7) the rate of mortality of poisoned children was 2.5%. Beatris Al. et al. registered that (7) 2.9% of children passed away due to poisoning. Other authors (21, 22, 23) registered that the rate of mortality among poisoned children is 1.85-3%. The high rate of mortality of poisoned children of 13.6% was registered by Babar M. et al. (3) in Pakistan, whereas in India 11.6% according to Nabeel Manzar et al. (1).

## 6. CONCLUSION

Poisoning in children is relatively frequent and is the result of the reaction of combination of substances, a child, a family and child's environment.

All preventive measures against poisoning should be taken and all medical personnel, family and the society in general should be included in it.

From our practice it is evident that the society is not well informed regarding the poisoning in general. Therefore written and electronic media as well as other methods should be used for its health education.

The immediate task should be formation of the toxicological center in Prishtina as a reference center for all Kosovo.

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The image shows a screenshot of the EUPHA website. At the top left is the EUPHA logo (European Public Health Association). To its right is the tagline: "An independent scientific and professional voice for public health in Europe". Below the logo is a navigation menu with links: About EUPHA, Public Health in Europe, Members, EUPHA Sections, EUPHA Conferences, European Journal of Public Health, EUPHA Publications, EUPHApedia, Projects, and Links. A "Login to EUPHA" section is also visible with fields for "Login:" and "Password:" and a "Submit" button. The main content area is titled "Malta 2012" and features the "EPH EUROPEAN PUBLIC HEALTH CONFERENCE" logo. Below this is a link: "Click here for the latest news". Logos for EUPHA, ASPHER, and the Malta Association of Public Health Medicine are displayed. The conference title "MALTA 2012" is prominently shown in large red letters, followed by the text: "5th ANNUAL EUROPEAN PUBLIC HEALTH CONFERENCE 2012", "All Inclusive Public Health", "Portomaso, St. Julian's, Malta", "Hilton Conference Centre", and "8 - 10 November 2012".