

## Epidemiological-Clinical Study on the Acute Ethylic Alcohol Intoxications in Children

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**ABSTRACT Methodology.** An epidemiological-clinical study was carried out on the acute ethylic alcohol intoxications (AEAI) in the children, aged 0-16 years, admitted to the 2<sup>nd</sup> Pediatric Clinic of the Emergency County Hospital in Craiova, between 1.01.2000 and 31.12.2007. **Results.** During the 8 years of study, there were admitted 119 children with AEA; 98 (82.4%) were voluntary and 21 (17.6%) accidental (in children under 7 years). The group structure – in children with accidental intoxications: M/F= 12/9, U/R= 9/12; in children with voluntary intoxications: M/F= 69/29, U/R= 67/31, age group (years): 1-7= 21, 7-10= 13, 10-14= 46, >14= 39 cases. The type of ingested alcohol: wine 32 cases, plum brandy 20, beer 16, liquor/ cognac/ cherry brandy each in 7 cases, whisky 3, gin 2, cocktail 21, combinations with other toxic products: alcohol + glues/ varnish/ diazepam in 4 cases. The clinical manifestations in children with accidental intoxications: sleepiness in 11 cases, vomiting in 10, alcohol smell in 8, walking and speaking disorders in 4, unrest in 3, hypothermia in 3, coma in 5 cases; in children with voluntary intoxications: vomiting in 47, alcohol smell in 40, sleepiness in 33, walking and speaking disorders in 34, unrest in 15, euphoria in 2, aggressiveness in 1, Mallory-Weiss syndrome in 1 case, coma in 39. **Conclusions.** More than 2/3 of the AEA were voluntary. The accidental intoxications prevailed in M (61.1%), in R (61.1%) and they belonged to the age group 1-7 years. The most frequent clinical manifestations were: sleepiness, vomiting, alcohol smell. The voluntary acute intoxications were more frequent in M (71%), in U (68%) and in the age group 10-14 years (46%). The most frequent clinical manifestations were: vomiting, alcohol smell, and coma. The alcoholic coma was present in 23.8% in accidental intoxications and in 39.8% of the voluntary intoxications.

**KEY WORDS** acute intoxications, ethylic alcohol, children

### Introduction

Acute intoxications represent one of the major problems of the emergency pediatric care, due to its frequency and severeness.

The intoxication with ethylic alcohol in children is not so frequent, representing between 1.5 and 2.8% of all the acute intoxications. Considering the severeness, it is about an extremely serious intoxication, as it can cause irreversible cerebral lesions when there is an incorrect and late treatment [1,3].

The accidental intoxication with ethylic alcohol is different from the fetal alcoholism (phoetopatia), from the chronic alcoholism, as well as from deliberately alcoholic intoxication (alcoholic drunkenness) of the adolescent.

Almost all alcoholic drinks are incriminated. The alcoholic concentration of different drinks is of 6-12<sup>o</sup> for beer, 10-14<sup>o</sup> for wines, variable, sometimes with high concentration for plum brandy, and of about 40<sup>o</sup> for vodka, whisky, gin, liquor. The quantity of pure alcohol (in grams) in

a drink can be calculated by multiplying its concentration (in grades) with the alcohol density (0.79). The minimum lethal dose is 3 g pure alcohol/ Kgc [2,3].

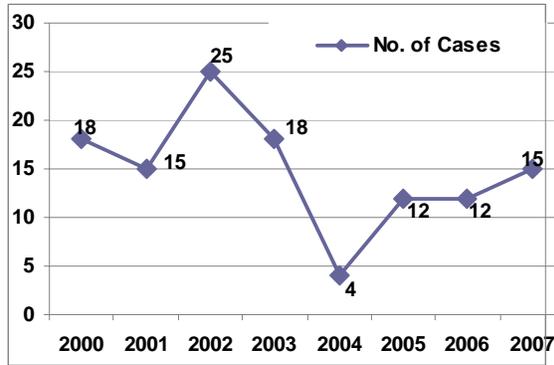
### Material and method

A retrospective epidemiologic-clinical study was carried out on the acute ethylic alcohol intoxications (AEAI) in children aged 0-16 years, admitted in the 2<sup>nd</sup> Pediatric Clinic of the Emergency County Hospital in Craiova, over a period of 8 years (1.01.2000 - 31.12.2007).

The study group includes 119 cases. The following aspects are studied: the distribution of cases on study years, the accidental character (in children < 7 years) or the voluntary one in intoxications, gender, social origin, age groups distribution, the type of ingested alcohol, the clinical manifestations, day of week, admittance hour, evolution, and the period of hospitalization.

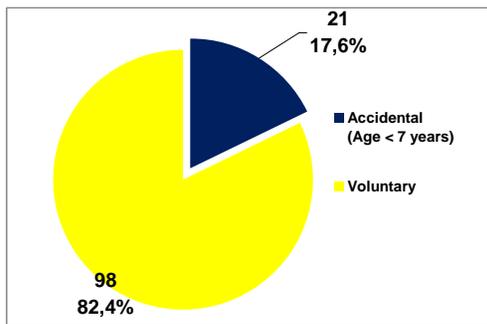
**Results**

The distribution of the 119 cases on study years was as follows: in 2000 - 18 cases, in 2001 - 15, in 2002 - 25 cases, in 2003 - 18 cases, in 2004 - 4, in 2005 - 12, in 2006 - 12, in 2007 - 15 cases (figure 1).



**Figure 1 Case Distribution According to Study Years**

By analyzing the type of the intoxications, one can notice that: 98 (82.4%) were voluntary and 21 (17.6%) were accidental (figure 2).



**Figure 2 Characteristics of Intoxication**

Distribution of children with AEAI according to sex, depending on the intoxication type:

- Accidental acute intoxications: 12 (57.2%) were males and 9 (42.8%) were females; sex ratio M/F = 1.34;
- Voluntary acute intoxications: 69 (70.4%) were males and 29 (29.6%) females; sex ratio M/F = 2.38 (table no. 1)

Distribution of children with AEAI according to social environment, depending on the type of intoxication:

- Accidental acute intoxications: 9 children (42.8%) came from urban environment and 12 (57.2%) from the rural one;
- Voluntary acute intoxications: 67 children (68.4%) came from the urban environment

and 31 (31.6%) came from the rural one (table no. 1).

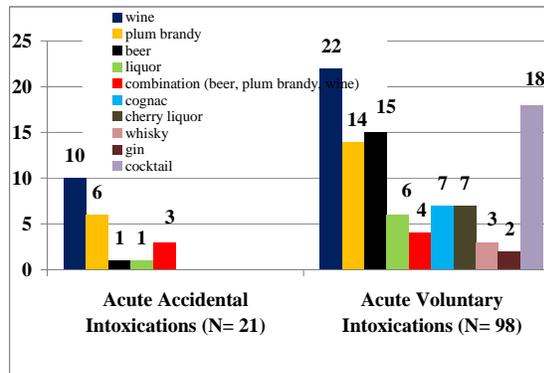
Distribution according to age groups: 1-7 year age group 21 children (17.7%); 7-10 year age group 13 children (10.9%); 10-14 year age group 46 children (38.6%); over 14 years 39 (32.8%) (table no. 1).

**Table 1 Distribution of Children with AEAI According to Sex, Social Environment, Age Groups Depending on the Type of Intoxication**

		Acute Accidental Intoxications (N = 21)	Acute Voluntary Intoxications (N = 98)
Sex	M	12 (57.2%)	69 (70.4%)
	F	9 (42.8%)	29 (29.6%)
Social Environment	U	9 (42.8%)	67 (68.4%)
	R	12 (57.2%)	31 (31.6%)
Age Group (years)	1 - 7	21 (17.7%)	
	7 - 10	13 (10.9%)	
	10 - 14	46 (38.6%)	
	> 14	39 (32.8%)	

Type of ingested alcohol:

- accidental acute intoxications: wine in 10 children, plum brandy in 6 children, beer in 1 child, liquor in 1 child, combinations (beer, plum brandy, wine) in 3 children;
- voluntary acute intoxications: wine in 22 children, beer in 15 children, plum brandy in 14 children, cognac in 7, cherry brandy in 7, liquor in 6 children, whisky in 3 children, gin in 2 children, cocktail in 18 children, combinations with other toxic products: alcohol + glue/ varnish/ diazepam in 4 cases (figure 3).



**Figure 3 Distribution of Cases Depending on the Type of Ingested Alcoholic Drink**

The clinical manifestations in children with AEAI, according to their frequency, were as follows:

- in children with accidental acute intoxications: sleepiness in 11 children, vomiting in 10,

- alcohol smell in 8, walking and speaking disorders in 4 children, unrest in 3 children, hypothermia in 3 children; alcoholic coma was registered in 5 children (23.8%);
- in children with voluntary acute intoxications: vomiting in 47, alcohol smell in 40, sleepiness in 33, walking and speaking disorders in 34 children each, unrest in 15, euphoria in 2, aggressiveness in 1, Mallory-Weiss syndrome in 1 case; coma was registered in 39 children (39.8%).

Particularities of some cases:

- 2 children, aged 15 years, from the urban area, a male and a female, with previous behaviour disorders;
- a girl from the urban area, aged 15 years, carrying a cardiac by-pass;
- a boy, aged 14 years and 8 months, from the urban area, treated for epilepsy;
- 2 boys, one aged 15 years, from the urban area and the other, aged 4 years, from the rural area – both of them were admitted for the second time for ethylic alcohol intoxication;
- 2 girls from the rural area, one aged 8 years – she was found at home with her family being drunk, while the other, aged 3 years and 6 months, who was admitted with her drunkard mother;
- a child, male, aged 6 years, from the rural area, who used to ingest small quantities of alcohol, at home;
- 2 homeless children > 14 years.

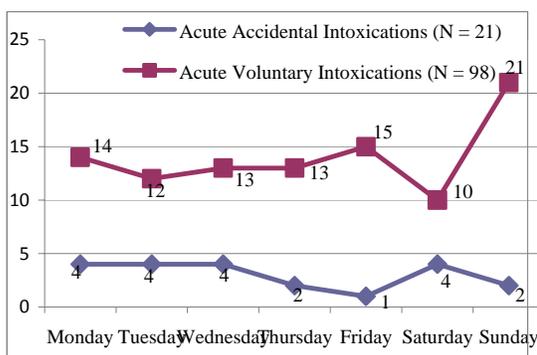


Figure 4 Distribution of Cases According to the Day of the Week When Alcohol Was Ingested

We analyzed the distribution of the cases according to the intoxication type and the day of the week when the intoxication occurred:

- accidental acute intoxications: on Monday 4 cases, on Tuesday 4, on Wednesday 4, on Thursday 2, on Friday 1, on Saturday 4, on Sunday 2 cases;

- voluntary acute intoxications: on Monday 14 cases, on Tuesday 12, on Wednesday 13, on Thursday 13, on Friday 15, on Saturday 10, on Sunday 21 cases (figure no. 4).

The analysis of the admission hour into the hospital, according to the intoxication type, showed the following aspects:

- in children with accidental acute intoxications: between 600 and 1200 6 children (28.6%); between 1200 and 2000 10 children (47.6%), after 2000 5 (23.8%) cases;
- in children with voluntary acute intoxications: between 600 and 1200 4 children (4.1%); between 1200 and 2000 29 cases (29.6%), after 2000 65 (66.3%) children. (figure no. 5)

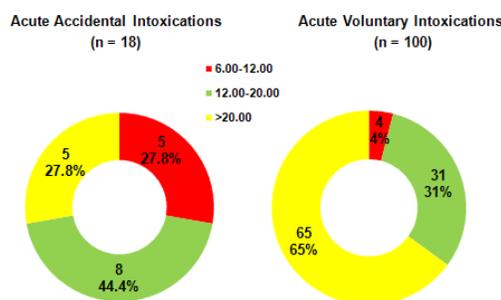


Figure 5 Distribution of the Cases According to the Admission Hour

There was registered one death by accidental intoxication – a girl aged 3 years, from a rural area who ingested plum brandy given by some other children.

The average period of hospitalization was: in accidental acute intoxications  $2.05 \pm 1$  days, while in the voluntary acute intoxications  $3.8 \pm 2.6$  days.

### Discussions

In a study carried out over a period of three years on 319 cases with various acute intoxications, the alcohol ranked fourth with a frequency of 10% [5].

In our study, AEAI in children had a variable distribution, with a frequency peak in 2002 (25 cases), with a low frequency in 2004 (4 cases) and with a yearly average of 14.9 cases.

Most of the cases, 98 (82.4%), were voluntary acute intoxications. The accidental intoxications were registered in fewer cases, 21 (17.6%). The present incidence of ethanol intoxication at an early age in our country is still unknown.

In teenagers, the statistics show an increased incidence of AEAI especially in the northern

countries and in the Eastern Europe. In France, 52% of the teenagers drink alcohol, while 30% presented alcohol acute intoxications. In Switzerland 4 % of the school students (11-16 years) presented AEAI, and the proportion reaches 10% in the over 16 year old group. The European literature data show that Switzerland holds an average position regarding the alcohol ingestion in teenagers, definitely below the one present in the northern countries or in the East European countries [4].

In a study which was carried out in our country, in highschools, on a group of 829 adolescents, 13.7% boys and 9.2% girls presented AEAI [6].

AEAI were more frequent in males, both in the accidental intoxications (57.2% of the cases), and in the voluntary acute intoxications (70.4%).

In the specialty literature, the statistical data shows that, in boys, the alcohol consumption is higher than in girls [6,8].

According to the social environment, AEAI were more frequent in the rural area (57.2%), in those with accidental intoxications, and in urban area (68.4%) in those with voluntary acute intoxications.

The age group which registered the highest frequency was the 10-14 years group (38.7% of the cases), followed by the over 14 year group (32.8%); in the 1-7 year group 17.6% of the cases and in the 7-10 year group 10.9% presented AEAI.

In the 1-7 year group, we considered that the accidental feature of the intoxication is given when, due to the age curiosity and lack of surveillance, the children ingest alcohol which they find in their house.

The little children usually drink large amounts of alcohol as compared to their weight, and the alcohol concentration in blood reaches high levels in a very short time. The capacity of the liver to metabolize such a quantity of alcohol is incomplete until the age of 5 years. The possibility of a serious neurological effect is always raised at that age [1].

An investigation which was carried out in the teenagers between 11 and 15 years [4] revealed the reasons that determine them to consume alcohol:

- they wanted to taste it;
- they wanted to "mark" the great events;
- they like the taste of alcohol;
- for other reasons (more or less declared);
- "my friend drink too";
- I like the alcohol effects;
- I feel better;

- It is a familial habit.

The most frequent types of alcohol which were ingested were as follows: in children with accidental intoxications - wine 10/21 children, plum brandy 6/21 children; in children with voluntary intoxications: wine 22/98, followed by beer 15/98 children, plum brandy 14/98 children, cocktail 18/98 children.

In one study carried out in our country, the beer represents the most frequently consumed alcohol both in boys (80% of those interviewed) and in girls. Other studies show that in most of the cases (40%) we talk about the wine ingestion, in 33% cases plum brandy ingestion, in 16% cases liquor and in 7-8% vodka and whiskey. Regarding the homemade alcohol, 50% of the teenagers said that they could get it quite easily. This data can also be correlated with the place where they last drank alcoholic drinks. The most frequent place for consuming alcohol was at home, for 38.4% of the boys and 18% of the girls. [6,7].

The most frequent clinical manifestations in AEAI were, in the children with accidental intoxications: sleepiness in 11 children, vomiting in 10; alcohol smell in 8; 5 (23.8%) children were brought to hospital with an alcoholic coma. In voluntary intoxications: vomiting in 47 children; alcohol smell in 40; sleepiness in 33 children and walking and speaking disorders in 34 children; Mallory-Weiss syndrome was registered in 1 case; the alcoholic coma was present in 39 children (39.8%).

The literature data [6] shows the incidence of the alcoholic coma between 13 and 50% out of the alcoholic intoxications. In this study, we also encountered special cases: children with behaviour disorders in 2 cases, a girl with a cardiac bypass and a boy with a treatment for epilepsy, children (2 cases) who were admitted before into hospital for the ethylic alcohol intoxication, children who were found drunk together with other members of their families (2 cases) or who had previously ingested ethylic alcohol (1 case) and 2 homeless children with repeated episodes of hospitalization because of ethylic alcohol intoxication, who ingested, besides alcohol, varnish, glue, and diazepam.

This information reveals the following facts:

- some children come from families which consume alcohol;
- in other situations, an investigation must be carried out in order to find out the factors which led to the alcohol ingestion, if we take into account the fact that alcohol intoxications were registered even in the children with

disorders that clearly forbid the alcohol ingestion;

- the need for a psychiatric examination;
- the need for information and dialogue with the children on the alcohol ingestion effects;
- programmes for preventing the alcohol ingestion must be elaborated, as well as knowing its effects and means of intervention.

The analysis in the admission day (the day of alcohol ingestion) showed that in children with accidental intoxications the distribution was relatively uniform, during days of the week, between 2 and 4 cases, excepting Friday when there was no case registered. One explanation could be that, in these cases, the accidental ingestion is not related to a special moment or event. In the voluntary intoxications, most of the cases (21) were admitted on Sunday, after different celebrations, shows, events.

The admission hour shows that, in the accidental acute intoxications, approximately 2/3 of the cases (76.2%) were admitted during daytime, while in the voluntary acute intoxications, more than half of the cases (66.3%) were admitted after 8 o'clock p.m., which demonstrates that, most of the time, the ingestion was related to events which took place in the evening.

One death was registered by accidental intoxication in a 3 year old girl, from the urban area.

The average hospitalization period was of  $2.05 \pm 1$  days in the accidental acute intoxications and slightly increased in the voluntary acute intoxications ( $3.8 \pm 2.6$  days).

## Conclusions

Over 2/3 of AEAI were voluntary; these prevailed in the 10-14 year group (38.6%), followed by the group over 14 years (32.8%).

The accidental acute intoxications prevailed in males (57.2%) and in those from the rural areas (57.2%). The most frequent manifestations were sleepiness, vomiting and alcohol smell.

The voluntary acute intoxications were more frequent in the males (70.4%) and in those from the urban areas (68.4%). The most frequent clinical manifestations were: vomiting, alcohol smell and coma.

Coma was present in 23.8% of the accidental intoxications and in 39.8% of the voluntary intoxications.

Mortality by ethylic alcohol intoxication was of 0.83%.

## References

1. Beattie J.O., Hnll D., Cockburn F., Children intoxicated by alcohol in Nottingham and Glasgow, 1973-84- British Medical Journal, Vol. 292, 27 February 1986, 519-527.
2. Ciobanu Laura, Despre tutun și alcool, Viața Medicală, Anul X, nr. 440, 29 mai, 1998.
3. Dragomir D., Popescu V., Intoxicațiile acute la copil, Intoxicația acută cu alcool etilic, Ed. Medicală, București, 1985, p. 65-68.
4. Miu N. Tratat de medicina adolescentului, Alcoolul, fumatul și drogurile în adolescență, Ed. Casa Cărții de Știință, Cluj, 1999, p. 532-534.
5. Stancu Polixenia, et. all, Studiu privind frecvența intoxicațiilor acute la copii, Craiova Medicală, Vol. 8, Nr. 4, Ed. Medicală Universitara Craiova, 2006, p. 265-271.
6. Vasile Iuliana, Dincă Irina, Dima Claudia, Consumul de alcool și droguri la adolescenții din România, Viața Medicală, Anul VIII, nr. 334, 26 iulie, 1996.
7. Weinberg L., Wyatt JP Children presenting to hospital with acute alcohol intoxication; Emerg. Med. J. 2006; 23(10):774-6 (ISSN: 1472-0213).
8. Woolfenden S.; Dossetor D., Williamsk. Children and adolescents with acute alcohol intoxication/ self poisoning presenting to the emergency department, Arch. Pediatr. Adolesc. Med. 2002; 156(4):345-8 (ISSN: 1072-4710).

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