Study of Acute Alcohol Poisoning in Children Admitted to a Emergency Hospital Pirogov in Sofia, Bulgaria

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Abstract

Aim. The aim of the current study is to analyze the medical and social dimensions of acute alcohol poisoning in children with regard of improving prevention of addictive habits and develop effective preventative strategies for reducing underage alcohol consumption.

Methods. We have studied the patients at the age up to 18 years with acute alcohol poisoning hospitalized in the Children Toxicology Department of Emergency Hospital Pirogov, Sofia, Bulgaria, from January 1, 2007 to June 31, 2008. All of them were at teen years – between 12 and 17 years old. Data on children were retrived from hospital medical records (age, sex, level of consciousness, blood ethanol level). The initial blood ethanol level was measured on admission by thin-layer chromatography for each patient. We have used the inquiry method - specially created for the purpose of the survey questionnaire comprising 39 questions (location and the reason for drinking, type of alcoholic beverage, age at first drink, combination alcohol-illicit drug, type of family, education and employment of parents, frequency of alcohol consumption by parents, consecutiveness of the children in family, presence of siblings, presence of children in a single room, interests etc.). Psychiatric interview was used.

Results. We have studied 137 children with acute alcohol poisoning. Average age of children intoxicated by alcohol was 14.91±1.45 years. 77 (56.2%) are boys and 60 (43.8%) girls. The results demonstrate tendency of increase of the poisonings in weekends and in late afternoon and evening. On admission to hospital most of them had different levels of depressed consciousness: 61.3% were somnolent, 28.5% were soporous and 5.1% were comatose. Blood ethanol level was over 2.00 mg/ml in 40.2%. In the 21 (15.3%) cases children have been poisoned at the first alcohol consumption. No repeated hospitalization for acute alcohol poisoning in the study group for that period has been registered. Combination alcohol-illicit drug was observed in 13 children (9.5%). Children most often used one type of alcoholic beverage. The most frequent alcoholic beverage leading to intoxication is the vodka (63.1%). 64% of the children come from complete families. Both parents have secondary education in 79.7% and in 53.3% both parents are employed. 60% were the first born child in the family. First alcohol consumption was at the 12 years and 10 months for boys, and at 13 years for girls. The most frequent reason for alcohol consumption was meeting and communicating with friends. The students have approximately 1.20 euro daily.

Conclusion. Influence of “the group” is the main cause of alcohol consumption in adolescence. There is no increasing tendency for combining alcohol with other psychoactive drugs. We consider the brief intervention prior to hospital discharge as a preventive factor for repeated poisonings.

Introduction

Medical and social problems associated with alcohol addiction have raised great concern on the issue of the increasing prevalence of alcohol poisoning in children. The overwhelming exhibit of alcoholic beverages and the fact that they are easily available combined with
the dominant motivation of curiosity and aping in children, the decreased preventative psychological protection, the low value thresholds in the majority of children of school age generate an unfavourable psychosocial situation and have an influence on the prevalence of alcohol intoxications among them. As a result, the society is faced with a real lack of protection of children from the alcohol expansion [1, 2]. The preventative models depend on the specific local conditions in individual countries and regions. The preventive intervention is intended to reinforce the protective factors, identified to have an influence on alcohol use in young people [3, 4].

The pattern of using alcoholic beverages in contemporary societies is determined by the traditional culture practices, background and social prohibitions existing in the individual countries. Different cultures have shown important differences in their evaluation of the scope of the problem. In Bulgaria, there is a high social tolerability to alcohol consumption. The study of Balabanova (1997) on alcohol consumption in Bulgaria found the pattern of drinking in Bulgaria. It uses a survey of 1550 adults in Bulgaria, in 1997 which found that overall 50.7% of men and 13.6% of women drink at least weekly. In both sexes, drinking is least common among the elderly and those living in villages. It is also less common among those reporting their financial status as poor. Muslims are less likely to drink than are orthodox Christians. Drinking is most common among those living in cities, with higher education and high incomes. Heavy drinking, defined as 80 g/day or more, is rare among women, but is ascribed to 18.2% of men. Heavy drinking as much more common among men living in Sofia and was less common among those whose financial situation was poor. At the levels of drinking reported, it can be expected that alcohol is making a substantial contribution to the burden of disease and premature mortality in Bulgaria [5]. Alcohol is increasingly being recognized as a major cause of the greater burden of disease and premature death in Eastern Europe than in the west [6].

A series of studies have provided evidence that alcohol effects in children differed from those in adults, i.e. there was an age specific difference. The criteria for identifying the severity of the intoxication include: impairment of consciousness, breathing and hemodynamics, marked clinical signs and syndromes from the organs and systems that are specifically targeted by the poison [7].

Compared to adults, injuries due to alcohol intoxications in childhood are manifested more rapidly and more severely due to the instability of enzyme systems involved in alcohol metabolism in children. Hypokalemia was the most important change in serum electrolytes. Alcohol intoxication causes metabolic acidosis and respiratory depression in children [8]. Coma and vomiting are the commonest symptoms in young teenagers intoxicated by alcohol. Severe toxicity, manifested as coma, occurs at lower blood alcohol level in young teenagers than in adults. The effect of ethanol on the state of consciousness is directly proportional to blood alcohol level [9].

The aim of the current study is to analyze the medical and social dimensions of acute alcohol poisoning in children with regard of improving prevention of addictive habits and develop effective preventative strategies for reducing underage alcohol consumption.

Patients and Methods

Patients
We have studied the patients at the age up to 18 years with acute alcohol poisoning (diagnostic category T 51.0) [10], hospitalized at the pediatric care unit, Toxicology Clinic of Emergency Hospital Pirogov, Sofia, Bulgaria, from January 1, 2007 to June 31, 2008. All of them were at teen years – between 12 and 17 years old. Admission to the pediatric care unit of Toxicology Clinic was made based on the clinical presentation of acute alcohol poisoning. Pediatric care unit is only specialized one on a nationwide scale department for the treatment of acute poisoning in children.

Data collection
Data on children were retrieved from hospital medical records (age, sex, level of consciousness, blood ethanol level). The initial blood ethanol level was measured on admission by thin-layer chromatography for each patient. We have used the inquiry method - specially created for the purpose of the survey questionnaire comprising 39 questions (location and the reason for drinking, type of alcoholic beverage, age at first drink, combination alcohol-illicit drug, type of family, education and employment of parents, frequency of alcohol consumption by parents, consecutiveness of the children in family, presence of siblings, presence of children in a single room, interests etc.). Psychiatric interview was used. The received data were analyzed and results presented.
Statistical analysis

Data were analyzed using the statistical package SPSS 16.0.1. Statistical analysis was performed using Chi-squared test, Fisher’s exact test, Kolmogorov-Smirnov two-sample test, Mann-Whitney (U) test, Student’s t-test. $P$ value < 0.05 was considered as statistically significant.

Results

We have studied 137 children with acute alcohol poisoning hospitalized from January 1, 2007 to June 31, 2008. 1022 children were hospitalized to intoxications during a investigated period. Average age of children intoxicated by alcohol was 14.91 ± 1.45 years. 77 (56.2%) are boys and 60 (43.8%) girls. The results demonstrate interesting picture: tendency of increase of the poisonings in weekends and in late afternoon and evening. Twenty seven children (19.7%) were hospitalized on Sunday, 21 (15.3%) on Fridays and 21 (15.3%) on Saturdays (Fig. 1).

In the 79 (57.7%) cases of intoxication were registered in the time frame from 7 p.m to 7 a.m, 37.2% from 1 p.m to 7 p.m and only about 5.0% between 7 a.m. and 1 a.m. On admission to hospital most of them had different levels of depressed consciousness: 84 (61.3%) patients were somnolent, 39 (28.5%) were soporous and 12 were comatose (5.1%). In the 64 (46.7%) cases blood ethanol level was 1.30 mg/ml-1.99 mg/ml and in the 55 (40.2%) was 2.00 mg/ml-2.99 mg/ml. The highest estimated ethanol level (3.80 mg/ml) was found in the blood of a 17 year-old boy. In the 21 (15.3%) cases children have been poisoned at the first alcohol consumption. No repeated hospitalization for acute alcohol poisoning in the study group for that period has been registered. Combination alcohol-illicit drug was observed in 13 children (9.5%). The consumption implemented usually outdoors among friends and classmates. The location where children got intoxicated was at park (56.2%), at home of friends (26.8%) and clube (17.0%). The mean consumed quantity of alcohol is higher among the girls (79.68 g of alcohol) compared with 55.98 g among the boys ($P$<0.001). The largest average amount of alcohol had been taken at the home of a friend (about 81 g of alcohol). Close to this figure was the amount consumed at a pub (about 79 g of alcohol). Significantly lesser was the average amount of alcohol known to have been consumed in the open air (about 63 g of alcohol). To perform this analysis, different types of alcohol were converted to an equivalent amount of ethanol, according to the following standards: vodka, brandy, whiskey 40º – 31.2 g/100 ml; wine – 8.8 g/100 ml; beer – 3.5 g/100 ml [11-13]. The reason for alcohol consumption was meeting with friends 93 cases (68.9%), birthdays (3.7%), emotional disorders (5.1%), family celebration (3.7%) and other reason in 4 cases (2.9%). Children most often used one type of alcoholic beverage - 84 (61.0%). The most frequent alcoholic beverage leading to intoxication is the vodka - 63.1% (Fig. 2).

The majority of children was educated in families with more than one child (68.6%). 64% of the children come from complete (nuclear, with both parents) families. Both parents have secondary education in 79.7% and in 53.3% both parents are employed. The frequency of alcohol consumption from the parents is in connection with presence of alcohol at home (Table 1, Table 2).

60.0% were the first born child in the family. Children who are a single child in the family use alcohol less often than those who have brothers and sisters. No significant difference in the self-stated frequency of alcohol consumption between male and female children was observed. The gender of the children did not have...
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a significant effect on the age at which the first drink was consumed.

First alcohol consumption was at 12 years and 10 months for boys and at 13 years for girls. The intoxications were more frequent among the children with good results in the school (55.0%), who studied at a college, who knew foreign languages (\( P = 0.001 \)) and had been detected (\( P = 0.818 \)). In practical terms, children in single parent families had no less pocket money than children in complete families. The students have approximately 1.20 euro daily.

### Discussion

Toxicological problems in childhood are of particular interest because of their actuality, urgency and multifactor determination. Alcohol is one of the most common contributors to injury and criminal behaviour among young people. Early onset of alcohol use increases risk for chronic alcohol addiction. One of the major challenges nowadays is prevention of underage alcohol access.

Our study represents the first systematic research of the alcohol intoxications among children in Bulgaria. We analyzed the data for a single Children Toxicology Department in Sofia. 1022 children were hospitalized to intoxications during an investigated period. We cannot exclude the possibility that children who manifested minor signs of alcohol poisoning were treated at home but we believe that our study shows the actual trend of alcohol poisoning among children in Sofia. The results of our study coincide with data from other European countries studies.

A Slovak Republic study found that the average age of the patients with alcohol intoxication presenting to hospital was 15.1 ± 1.7. The proportion of children admitted with alcohol intoxication increased every year [14]. Our study showed the mean age of alcohol poisoned patients (mean ± standard deviation) 14.91 ± 1.45 years. Croatian study by Bitunjac and Saraga [15] found that 73.2% of children were hospitalized on weekends and 79% of children got intoxicated outside their homes. Our study showed that children usually drank outside their homes (56.20%), and mostly on weekends (35%). The results of study (Weinberg and Wyatt, 2006) confirm the heavy use of alcohol by some young children. The most common type of alcohol consumed was spirits, in the form of whisky, gin, vodka and tequila. No significant association was seen between age and blood alcohol levels [16]. Our study showed that children most often used one type of alcoholic beverage, and the most frequent alcoholic beverage leading to intoxication is the vodka.

Biochemical disturbances in young teenage alcohol intoxicants resemble those previously found in adults. The severe toxicity by ethanol, manifesting in

### Table 1: Availability of information self reported by a child on frequency of father’s alcohol consumption and presence of alcohol at home.*

<table>
<thead>
<tr>
<th>Weekly distribution of alcohol consumption</th>
<th>Alcohol at home</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No N %</td>
<td>Yes N %</td>
</tr>
<tr>
<td>0 times a week</td>
<td>24 80.00</td>
<td>7.30 12 14.63</td>
</tr>
<tr>
<td>1 times a week</td>
<td>7 13.33</td>
<td>5.62 6 16.67</td>
</tr>
<tr>
<td>2 times a week</td>
<td>0 0</td>
<td>0 23 28.05</td>
</tr>
<tr>
<td>3 times a week</td>
<td>0 0</td>
<td>0 8 9.76 3.28 &lt;0.05</td>
</tr>
<tr>
<td>5 times a week</td>
<td>0 0</td>
<td>0 3 3.66 2.07 n.s.</td>
</tr>
<tr>
<td>7 times a week</td>
<td>2 6.67</td>
<td>0 23 28.05</td>
</tr>
<tr>
<td>Total</td>
<td>30 100.00</td>
<td>23 100.00</td>
</tr>
</tbody>
</table>

* Abbreviations: Sp – standard error of a proportion; † P – P value; ‡ n.s. - No statistically significant association.

### Table 2: Availability of information self reported by a child on frequency of mother’s alcohol consumption and presence of alcohol at home.*

<table>
<thead>
<tr>
<th>Weekly distribution of alcohol consumption</th>
<th>Alcohol at home</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No N %</td>
<td>Yes N %</td>
</tr>
<tr>
<td>0 times a week</td>
<td>40 93.02</td>
<td>3.88 60 72.29</td>
</tr>
<tr>
<td>1 times a week</td>
<td>3 6.98</td>
<td>3.88 7 8.43</td>
</tr>
<tr>
<td>2 times a week</td>
<td>0 0</td>
<td>0 7 8.43 3.05 &lt;0.05</td>
</tr>
<tr>
<td>3 times a week</td>
<td>0 0</td>
<td>0 1 1.20</td>
</tr>
<tr>
<td>5 times a week</td>
<td>0 0</td>
<td>0 1 1.20</td>
</tr>
<tr>
<td>7 times a week</td>
<td>0 0</td>
<td>0 7 8.43 3.05 &lt;0.05</td>
</tr>
<tr>
<td>Total</td>
<td>43 100.00</td>
<td>83 100.00</td>
</tr>
</tbody>
</table>

* Abbreviations: Sp – standard error of a proportion; † P – P value; ‡ n.s. - No statistically significant association.

who possessed a computer (93.0%). From the data about the after school interests among the children we can say that in their life predominate the non institutional forms of communication (cinema, music, non formal contacts etc.) at the expense of the institutional ones like school and family. Such factors as the kind of family, and being a single child in the family were not associated with alcohol consumption alone (\( P > 0.05 \)). The majority of single children in the family (n=31) had a room of their own (72.1%). No statistically significant association between the availability of a child’s own room and the gender of the children, if more than one in the family, has been detected (\( P = 0.818 \)). In practical terms, children in single parent families had no less pocket money than children in complete families. The students have approximately 1.20 euro daily.
coma, occurs in lower blood alcohol concentrations in children than in adults [17]. Our data have been compared to data from other studies. The most common are intoxication with blood alcohol level between 1.30 mg/ml -1.99 mg/ml.

Lamminpää reported that motives leading to alcohol intoxication are a wish to get drunk, experimenting and problems in human relations. The underlying problems are often family-related, such as divorce, an alcoholic parent and a lower socioeconomic group. Underlying family problems were usual; in 45% of the cases the family was broken and in 31% of the family’s one parent was an alcoholic. The lower the mother’s social group was, the higher the frequency of alcohol intoxication. Previous intoxications were reported in 9% of the cases. Most of the children’s intoxications were experimental (49%) [18, 19]. The most frequent reason for intoxication in our study was meeting with friends – 93 cases. Influence of ‘the group’ is the main cause for alcohol consumption in adolescence. Most of children are experiencing communication problems and the alcohol consumption ‘helps’ them to over come this problem and make communications easier. The conveyance of the center to socialization from the family towards the group leads to loss of emotional attachments to parents and their replacement with relation with the lots of people in the group, less influencing the personality as a whole, but forming certain behavioral models.

However, little is known about socio-economic differences in unhealthy lifestyles during adolescence. Parental socio-economic status is only of limited importance for episodes of drunkenness in adolescence [20]. Like social event the alcohol intoxications depends from a lot of familiar, cultural, educational, psychological and behavioural factors. The parents with secondary education predominated. The intoxications were more frequent among the children with good results in the school. For majority of adolescents alcohol intake correspond to attempt for building self-esteem, for integration in friend circle and in the world of grown-ups.

We were developed a programme for active selective prevention of the alcohol intoxication among children with aim to set limits of all health, social and economic damages due of alcohol by: limiting the demand for alcoholic beverages, the consumption of alcohol, increasing the quality of health education, upbringing, and value formation guidance; creating a system for control at schools, in the family, in the social group (among friends), and during leisure time. The model is based to the psychological and social approach. The concept of autor is to develop the different skills toward a positive direction of children’s life. A very important elements are there ability of resistance and the formation of habits for social frame of mind, communication skills and desire for change of hazardous behavior by thinking, preparation and execution. The psychological aspect of prevention is directed toward the formation of cognitive attitude to be successful. In the context of the health promotion the focus is to strengthen all aspects of the life [21].

Acknowledgments

We are grateful to Prof. Elena Shipkovenska and Prof. Aneta Hubenova for the critical reading of the manuscript.

References


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