

STATISTICALAL CONSIDERATIONS ON LETHAL INTOXICATION WITH METHYL ALCOHOL FROM BACĂU DISTRICT DURING THE PERIOD 1994 – 2007

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INTRODUCTION

Methyl alcohol or methanol is a toxic product, frequently used in the chemical industry, in pharmaceutical, and biochemical laboratories. Its physical-chemical and organoleptic properties have frequently led to its being taken for ethylic alcohol, generating numerous cases of methanol intoxication. In the fermentation and distillation processes of some alcoholic drinks/beverages, it can be found as a result of the degradation of the wood part of the along the distillation process. The sanitary norms limit the concentration of methyl alcohol in alcoholic drinks to a standard of 1%. This value is controlled for alcoholic drinks distilled in specialized firms, but it cannot be checked for drinks obtained by private producers at home, especially in the rural area. This type of products and the easy access to industrial products containing methanol have gradually led to intoxications. The toxicity of the methanol is given by formic acid which inactivates the ferric enzymes producing cellular anoxia and is also given by the untransformed fraction. As a consequence of the phenomena of cellular hypoxia, there is produced the metabolic acidosis with the increase of the anionic hole. This is a cumulative toxic substance. The toxic dose is of 0.15 mg/kg methanol 100%, the ingestion of 10 ml of methyl alcohol causes blindness and the lethal dose is of 30 to 60 ml. The symptoms of methanol intoxication starts with an inebriated state, followed by the increase of acidosis, hypotension, breathing condition leading to lung edema, digestive problems, agitation, convulsions. Eyesight problems install progressively. Acute and chronic intoxications can evolve into convulsive coma, hypotension, hypothermia, lung edema and death.

MATERIALS AND METHODS

There has been conceived, retrospectively, a study on a number of 57 cases of violent deaths by intoxication with methyl alcohol during the period

1994 – 2007. For all these cases, there have been analysed medical reports, copies of observation sheets for the persons hospitalized and partial investigation data from the Judiciary Police reports. There have been made qualitative toxicological determinations on the corpora delicti and the corpse biological material, that is, blood and urine samples. For qualitative determinations there have been used two successive titrimetric methods, a nonspecific one (sulfochromic), comprising the majority of reductive volatile products from the blood sample and distilled urine and another specific method (nytrochromic). These two methods are normally used to determine ethyl alcohol. Whenever there is a difference in the quantitative results of the two methods, respectively, high values for the sulfochromic method as compared to the nytrochromic one, it is considered the presence of methyl alcohol. These method, successively applied, emphasize ethyl alcohol and a volatile compound, in this case methanol. For identification, there has been applied a specific qualitative method with chromotropic acid and sulphuric acid, on distilled blood and urine or defecated blood, when methyl alcohol was traced in the biological product analysed. Form a statistical point of view, there have been evaluated a series of parameters, such as the age and sex of victims, as well as the geographical distribution over 1994-2007. The results have been intepreted and, subsequently, graphically represented.

RESULTS AND DISCUSSIONS

In the Bacau district, during the period 1994-2007, there have been toxicologically analysed 413 cases of violent deaths, out of which there resulted 57 cases (39 men and 18 women), in which death was caused by intoxication with methyl alcohol. The intoxications were due to consumption of methyl alcohol, methyl alcohol-based industrial products, alcoholic beverages containing methyl, ethyl alcohols and other toxic substances in 1994- 2007. From figure 1, we can see that the highest incidence of intoxications was in 2006 when there were registered 13 cases of violent deaths caused by methanol intoxication, in 2001 with 9 cases and in 1994 with 7

cases. Between 1995 and 2005, there has been reported no case of methanol intoxication; this led to a fluctuating evolution in the number of cases.

Out of the total of 57 cases of lethal intoxications with methanol, 39 cases were men, respectively 68%, and 18 women, that is, 32 % (see figure 2). In analysing the statistical values in figure 3, it is evident that most cases of intoxication were registered for men in 2001 (8 cases), in 2006 (9 cases) and the least numerous in 1999, 2002 and 2004 when there was one case per year. The highest values for women were reported in 1997 with 5 cases, the lowest in 2002 and 2003 with one case per year. There have been years (1996, 1998, 1999, 2000, 2007) when there have been registered no cases of women intoxication as compared to men intoxication.

According to statistical data, the age of the intoxicated persons ranged between 20 and 70. In figure 4, we can observe that the number of persons most frequently intoxicated belong to the age group of 40-50, which represents 18 cases out of the total number of methanol intoxications.

Out of the total number of registered and studied cases, according to statistical data, the number of intoxications in the rural area was twice bigger than in the urban area, respectively 38 rural cases to 19 urban cases. Figure 5 indicates that most cases were registered in 2006 (12 cases).

In corroborating the police reports with statistical data, we can mention cases of collective intoxication in the peripheral area of Bacau (4 cases), the rural area of Onesti (2 cases in 1991, 5 cases in 2001) and at the outskirts of Moinesti town (2 cases in 2005 and 5 cases in 2006).

Table 1. Cases of lethal intoxication in 1994–2007

No.	Type of intoxication	No. of cases	Period
1	methyl alcohol	4	1998, 2001, 2006
2	Ethyl alcohol and methyl alcohol	47	1994 - 2007
3	methyl alcohol and break liquid	1	1998
4	methyl alcohol and carbon monoxide	2	2006
5	methyl alcohol and Medicinal substances	1	2006

CONCLUSIONS

The significant difference in the number of cases between the rural and urban areas in the period 1994- 2007, as well as the fact that the majority of intoxications have been reported in marginal areas of the Bacau town, and especially Onesti and Moinesti, confer a social aspect to methanol intoxications. Rural areas are less developed from a cultural and economic point of view and this permitted the proliferation of alcohol consumption of doubtful quality prepared in private of fermentable products (grapes, berries, fruit) in improvised installations. Accidental intoxications with methyl alcohol are supposed to be due to the fact that in Bacau district there function some units that use methyl alcohol in the technological process for chemical and petrol products. These cases have occurred incidentally, with no implications of suicide or murder.

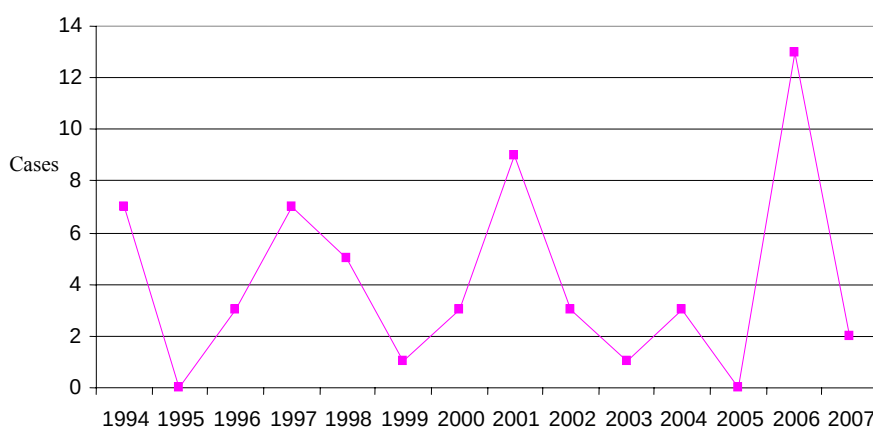
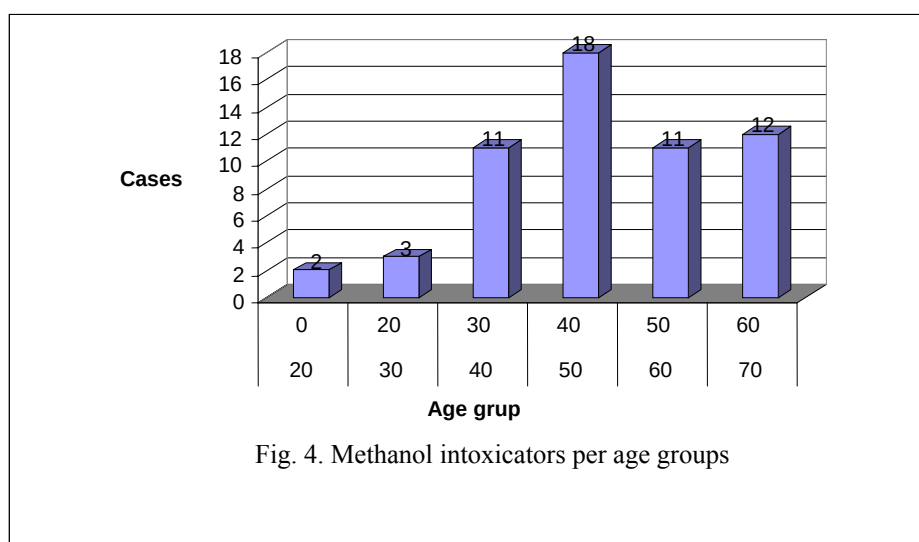
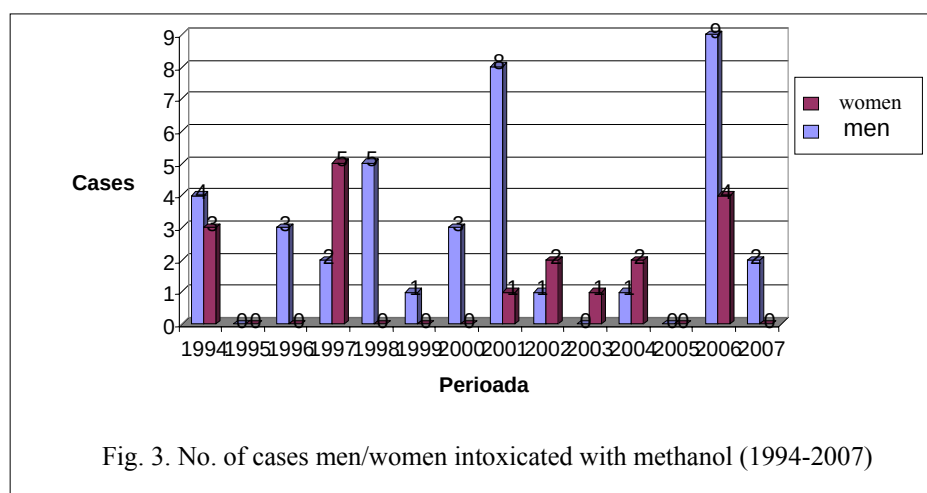
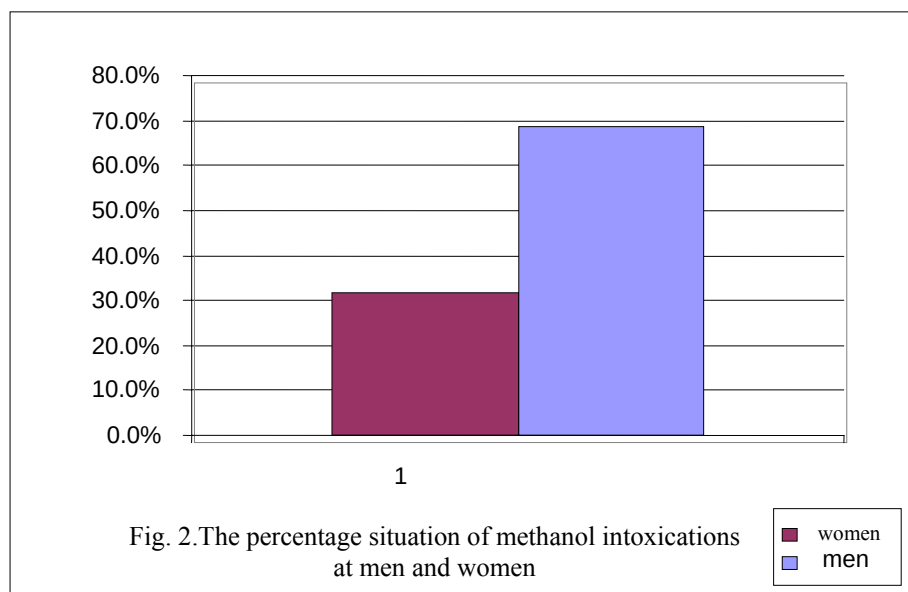


Fig. 1. No. of annual methanol intoxications



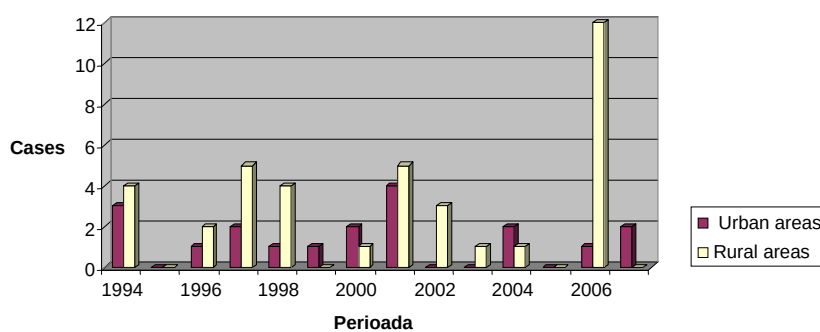


Fig. 5 No. of methanol intoxications cases in urban and rural areas (1994 - 2007)

ABSTRACT

The lethal intoxication with methyl alcohol from Bacău district during the period 1994 – 2007

Methyl alcohol or methanol is a toxic product, frequently used in the chemical industry, pharmaceutical, and biochemical laboratories. Its physical-chemical and organoleptic properties have frequently led to intoxications. In the Bacău district, during the period 1994-2007 there have been recorded 57 cases of lethal intoxication by methyl alcohol of which 39 men and 18 women. The distribution of the number of cases for the mentioned period is fluctuant; in the year 2001, there have been 9 recorded cases and in 2006, 13 cases in contrast to the years 1995 and 2005 with

no cases. According to the statistical data, the age of the intoxicated persons was between 40 and 70 years, the maximum of cases was registered in the group of between 40 to 50 years. We noticed significant differences between the cases of intoxication in the rural area then the urban area. Most of the times, the methanol intoxication is defined as a collective intoxication usually in the rural area. The large number of methanol intoxication from the rural area, as well as the majority of collective intoxication defines a social character due to this form of intoxication.

The purpose of our study is that of using statistical data to emphasize the incidence of lethal intoxications with methyl alcohol from the Bacău district during the period 1994 – 2007.

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