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Blood Alcohol Concentration in Suicide: A 10 Years Study

Andreea SZALONTAY¹, Victoria BURTEA², Petru IFTENI³

Abstract

The high number of suicides drew attention to medical professionals. In Europe suicide is one of the leading cause of death caused by intentional and unintentional injuries. Alcohol abuse is linked to impulsivity, aggression and suicide behaviour. We tried to evaluate the suicide rates and methods of suicide during a 10 years period. There were collected all the data provided by the archives of forensic services of Brasov county between 2002 and 2012 regarding age, sex, marital status, methods of suicide and alcohol consumption before suicide. The statistics included 589 men (83%) and 121 women (17%), sex ratio B: F=4.87. The mean age of the study group was 48.15 years. There were a significant difference between individuals with violent type of suicide compared with other types in terms of age and BAC. The patients who committed suicide by precipitating from heights are the group with the lowest blood alcohol concentration. Despite the reduction of number of suicides in the last 2 years the use of alcohol is strongly linked with suicide, especially when individuals exhibit high levels of blood alcohol concentration. Despite the improvement of this problem in the last years it remains a major issue for society.

Keywords: suicide, blood alcohol concentration, young people, suicide methods.

Introduction

Suicidal behaviour is a major public health problem worldwide. The high number of suicides drew attention to medical professionals. Last Report of WHO on the overall rate of suicide in the world dating back to 2000 and showed that the

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rates of suicide were 25 men for 10000 inhabitants and 6 women for 10000 inhabitants with 2000 new cases/day and a million/year (WHO, 2000). In Europe of 2002, suicide is the leading cause of death caused by intentional and unintentional injuries, in fact 21% of the total, and at the same time represents more than half of all intentional injuries exceeded more than twice the rate of hetero-aggression and 10 times the rate of lesions in wars (Almasi, *et al.*, 2009).

In Romania, the number of suicides varies geographically and is ranked between 7-15 cases per thousand inhabitants, with a higher incidence in areas inhabited by ethnic Hungarians at the same rates as in other European countries (Szádóczy *et al.*, 2000). There are strong evidences of genetic background of this phenomenon but frequently the cultural, socio-political or economic aspects of these countries influenced the phenomenon (Von Borczykowski *et al.*, 2011; Brent *et al.*, 2005).

Risk factors for suicide include mental disorders such as schizophrenia, major depression, bipolar disorder and substance abuse disorders (Lozano *et al.*, 2010; Harris *et al.*, 1998). Economic status, marital separation or divorce, jobless, financial loss, chronic illness or cancer are other important risk factors for suicide (Sainsbury P, 1986).

Long time alcohol usage is linked to impulsivity, aggression, lack of inhibition and refusal to obey the social norms. Alcohol abuse as drugs usage often impairs the course of mental disorders, especially in case of major depression, schizophrenia, bipolar disorder and anxiety in terms quality of life, relapses, loss of social status, increasing suicide risk (Wilcox *et al.*, 2004; Conner *et al.*, 2001; Greenwald *et al.*, 1994).

Objectives

The aims of the study were to evaluate de suicide in Brasov County between 2002 and 2012. We tried to determine if the cases of suicide remain constant in this interval. We also evaluate the impact of blood alcohol concentration in suicide.

Methods

The retrospective study was based on existing documents in the archive of forensic services and included all cases of suicide that took place in Brasov County, Romania during 2002-2012. Brasov is one of the biggest Counties in Romania with about 400000 inhabitants. The population are heterogenic with Romanians, Hungarians and German ethnics. In the summer and winter it is visited by many tourists from Europe and Asia.

Data were collected on age, sex, year of death, suicide type and BAC (blood alcohol concentration). Statistical analyses were performed using SPSS version SPSS 15.0. The differences between the two groups were compared using Student's t test. The chi-squared and Fisher's exact tests were used to assess categorical variables. Age adjusted odd ratio (OR) and 95% confidence interval (CI) were calculated by multivariate analysis using multiple, unconditional, logistic regression. P values less than 0.05 were considered to be statistically significant

Results

In the retrospective study entered a total of 710 cases recorded in Brasov forensic services in the period 2002-2010. The study included 589 men (83%) and 121 women (17%), sex ratio B:F=4.87. The mean age of the study group was 48.15 years. The annual number of suicides was relatively constant during the studied period, around 70 cases per year. There were a decreasing in cases in 2011 and 2012. Figure 1 shows stagnation or a slight decrease of the suicide rate in women between 2007 and 2011.

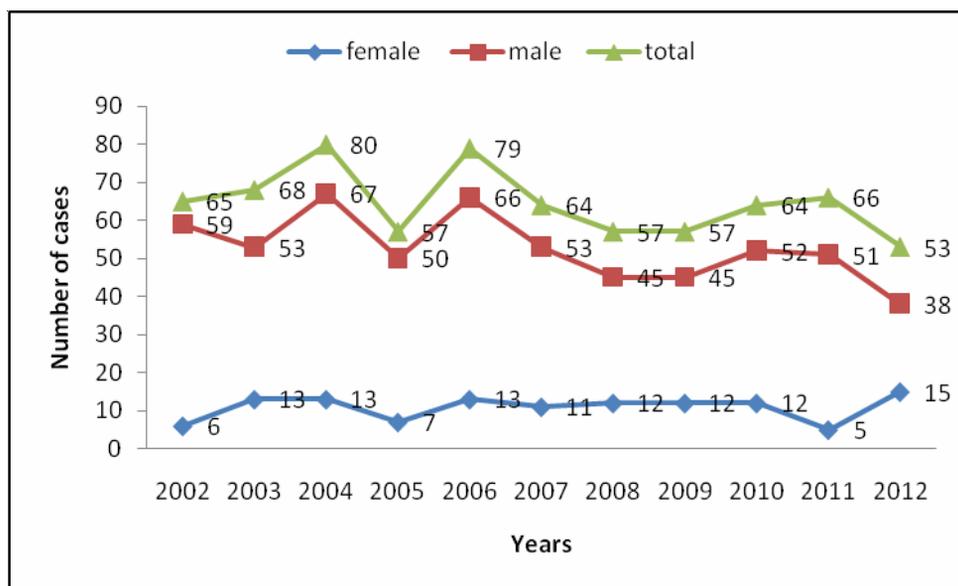


Figure 1. Number of suicides between 2002 and 2012

The main method of suicide was hanging with 556 cases (78.3%), followed by jumping from heights with 61 cases (8.5%) and poisoning with medicines 32

cases (4.5%). Other ways chosen to commit suicide was by poisoning with insecticide, cutting wrist, self-immolation, drowning, firearms and disposal in front of train. In the studied period there was a variable distribution of the number of suicides by age group. It is noted a steady increase in suicide with age once touching a peak in the 6th decade of life, when there were 170 suicides (Figure 2). In Brasov County like in most European Countries, suicide rates mainly increase with age, with exceptions in Ireland and Finland where suicide rates are maximal in middle-aged people with declines in elderly (Corcoran *et al.*, 2010; Voracek *et al.*, 2007).

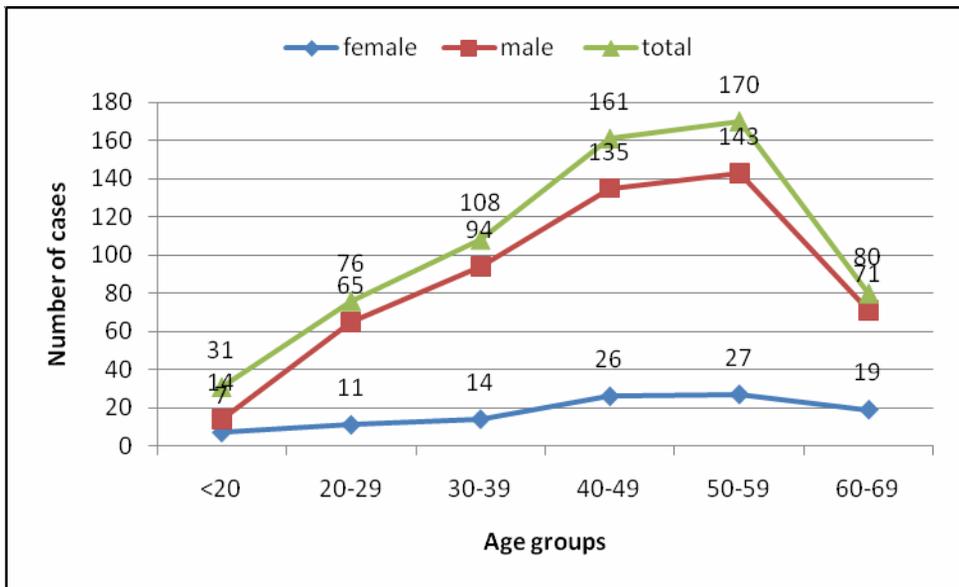


Figure 2. *Suicides on various age groups*

The results showed a great proportion of cases in which patients were intoxicated with alcohol before attempting suicide. In 329 cases (46.33%) alcohol was found in deceased persons, from whom 306 (93%) were males. In table 1 is presented the results regarding high levels of BAC. A significant number of individuals were intoxicated in the moment of suicide. In 208 cases (29.29%) values of BAC were above 1.00g/dL. The mean age of individuals were significantly lower (40.00 years vs 47.02 years) in cases with BAC above 2.00g/dL compared with those with BAC lower than 1.00 g/dL ($p < 0.005$).

Table 1. *The BAC concentration and mean, mean age and number of cases*

| BAC (g/dL) | Number (N) | BAC Mean (g/dL) | Age mean (years) |
|------------|------------|-----------------|------------------|
| <1.00 | 123 | 0.53 | 47.02 |
| 1.00-1.99 | 157 | 1.42 | 44.52 |
| 2.00-2.99 | 40 | 2.31 | 40.00 |
| >2.00 | 11 | 3.51 | 42.36 |

Only 2 cases (14.28%) were intoxicated in individuals with jumping from heights as a suicide method which may demonstrate a strong willingness to die. Similar studies conducted in other European countries revealed that alcohol usage are frequently found in individuals dead through suicide.

Discussions

The work is one of the first studies on the suicide rate among the population of Brasov is heterogeneous as ethnicity, including Romanians, Hungarians and Germans. The main finding is that alcohol was present in the blood of a significant proportion of cases and the average age of those who consumed alcohol were significantly lower than those without alcohol in the blood. Most of the cases were males which confirm studies of other authors (Hawton, 2000). The main method of suicide was hanging. There are a growing number of cases who used firearms. Individuals who chose to commit suicide by jumping from heights had the lowest rate of alcohol use which demonstrates readiness to die (Simon *et al.*, 2001). It is well known that alcohol is linked with poor response to bad social stimuli and with decrease serotonin levels (Seo *et al.*, 2008; Conner *et al.*, 2004). There were significant differences between cases in terms of age and blood alcohol concentration. Those with the highest BAC were younger than those with low BAC.

These findings are important because others studies reported that in many cases individuals who committed suicide were previously hospitalized or treated for alcohol abuse (Maurizio *et al.*, 2010). In some cases the psychological evaluation during hospitalization revealed anxiety or depression symptoms caused by emotional or financial problems but the treatment was stopped after discharge. The younger age of those who kill themselves being intoxicated demonstrated that alcohol abuse represents currently a major problem in national health and needs special programs of prevention (Hingson *et al.*, 2006). One of the study limitations was the degree of underreporting of suicide. It is known that some car crashes or falling from heights were initially reported as accidents and after criminal evaluation the conclusion was changed to suicide (Bourbeau, 1993). In other studies, authors reported that hanging or firearms are more accurately

reported as suicide than nonviolent methods, such as poisoning (Ajdacic-Gross *et al.*, 2006). The study showed that the traditional methods to commit suicide like hanging or jumping from heights are the most common methods and are quite similar worldwide (Stack *et al.*, 2005; Nordentoft *et al.*, 2006).

Firearms used in suicide were lethal at the same proportion with hanging (80-90%) (Shenassa *et al.*, 2003). This raises once again the issue of access to weapons, either for hunting or protection. Pesticides should have a strict storage and sale only in special circumstances. Prevention of suicides by restricting access guns, medicines potentially lethal and pesticide are methods that can be easily considered by authorities and must be reconsidered (Lester, 1998). Mass-media can help prevent suicide by linking suicide with negative outcomes such as pain for the suicide and his survivors (O'Connor, *et al.*, 2011).

Conclusions

Suicide is an important cause of mortality worldwide including Romania. We observed that hanging and jumping from heights were the leading causes of death by suicide in men and women. Those methods are extremely lethal and somewhat facile to the individuals. This study demonstrated the impact of alcohol usage in suicide. Preventive efforts to reduce the alcohol intake in group risk may decrease the annual number of suicide as well as the restrictive access to fire arms and pesticides.

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