

Liste AF<sup>1</sup>, Tabernero MJ<sup>2</sup>, Bermejo AM<sup>2</sup>

<sup>1</sup>Institute of Legal Medicine, Ministry of Justice, Santiago de Compostela, Galicia, Spain.

<sup>2</sup>Institute of Legal Medicine, University of Santiago de Compostela, Santiago de Compostela, Galicia, Spain.

### Abstract

We have performed a descriptive, retrospective and longitudinal study to determine both the characteristics of the individuals involved in a violent death as well as the circumstances surrounding the event that took place in the province of Lugo (Spain) during the time period between 2007 and 2009. Data was achieved from archives that belong to the Institute of Legal Medicine of Galicia's territorial branch in Lugo.

Alcohol is a psychoactive substance that is very commonly used worldwide. It is the most frequently used psychoactive substance in our country. It has been integrated in the Western World's cultural model of drug ingestion, coming to be considered a "partner in crime". The association between crime and alcohol had been established many years ago. Alcohol is known to increase the possibility or to be the direct cause of criminal conduct. In this study, we found that it is also involved in situations in which people die in an unnatural manner. A total of eighty-four cases of death associated with alcohol, representing 17.75% of all violent deaths, were reported in our study. The most commonly found profile consists in middle-aged males that suffer an accidental death during the weekend.

**Keywords:** Alcohol Consumption; Violent Death; Legal Medicine.

### \*Corresponding Author:

Alberto Fernández Liste,

Instituto de Legal Medicine, Ministry of Justice, Viena s/n, 15707, Santiago de Compostela, Galicia, Spain.

Tel: +34 981 540 482

Fax: +34 981 540 484

E-mail: [albertof.fernandez@justicia.es](mailto:albertof.fernandez@justicia.es)

**Received:** February 25, 2015

**Accepted:** April 02, 2015

**Published:** April 07, 2015

**Citation:** Liste AF, Tabernero MJ, Bermejo AM (2015) Alcohol's Influence on Violent Deaths. *Int J Forensic Sci Pathol*. 3(4), 105-109. doi:

<http://dx.doi.org/10.19070/2332-287X-1500025>

**Copyright:** Liste AF<sup>©</sup> 2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

### Introduction

The physical and psychosocial effects of the use and abuse of alcohol have been known since ancient times. However, it wasn't until 1849 when the Swedish physician Magnus Huss came up with the term "alcoholism" to unify the various physical and mental disorders as well as the family and social issue caused by this substance.

Spain currently occupies the sixth position worldwide in the con-

sumption of alcohol per capita. Each citizen consumes an average of ten liters of alcohol per year. 5.5% of the Spanish population between the ages of fifteen and sixty-four are considered risky drinkers. Also, 79% of the population consumes alcohol regularly making it the most commonly used drug [7].

The impact of alcohol consumption in Europe is evident. It has been associated with twenty-seven thousand accidental deaths per year of which seventeen thousand were due to traffic accidents. From this we can conclude that one out of every three deaths due to traffic accidents is associated with alcohol consumption. Alcohol has also been associated with two thousand homicides (four out of every ten were involved with alcohol consumption) as well as 10,000 suicides (one out of every six suicidal deaths is involved with alcohol consumption) [18].

This paper's objective is to determine the influence of alcohol in violent deaths, including accidental, homicidal and suicidal. The geographic location chosen was the province of Lugo (Galicia, Spain) for two reasons; the first being that Galicia is the Spanish region with the highest alcohol consumption and the second being that Lugo had the highest suicide rate in Galicia in 2007 and 2009 (in 2008 it was second to last province in Galicia with the highest suicide rate) [12].

### Objectives

1. Study the influence of alcohol in violent deaths in the province of Lugo in the time period between 2007 and 2009 as well as the tendency during those years.

2. Define the profile of the person who after alcohol consumption suffers a violent death.
3. Determine the moment with the highest risk of death under these circumstances.
4. Determine the most frequent cause of death.

## Materials and Methods

We have performed a descriptive and retrospective study. To do this, we used the database that belongs to the Institute of Legal Medicine of Galicia's (IMELGA) territorial branch in Lugo. First we reviewed all clinical histories from the time period between 2007 and 2009 that had an end result of death. Afterwards, data was collected from all cases of violent death in which the deceased tested positive for alcohol. Analysis of the blood samples was performed by the Faculty of Medicine's Department of Toxicology (Santiago de Compostela) as well as the National Institute of Toxicology (Madrid).

The following variables were studied carefully: age, gender, date of death, day of the week and month in which death occurred, judicial territory, medical history, main and immediate cause of death, medico-legal manner of death, alcohol blood level and the concurrence of other drugs.

The data was collected using an Access® form with a combined Excel® table, both from Office 2003®, and processed using the 15th version of SPSS®.

## Results and Discussion

We have studied a total of 473 violent deaths between January of 2007 and December of 2009, 84 cases of which tested positive for blood alcohol, representing 17.75% of the total.

### Age

The age range found in most of the cases that tested positive for alcohol was that comprised between 40 and 50 years of age followed by those from 55 to 65 years of age. It is a fact that the consumption in those individuals between 15 and 35 years of age is abusive on the weekends and therefore is associated with a higher risk of death. Nevertheless, the highest number of positive cases associated with violent death found in our study is in another age group. The average age is of 48.76 years old and the standard deviation is of 14,499 (Figure 1).

What is a known fact is that, although the tendency is to increase with age, alcohol consumption decreases after the age of 65 [7]. In contrast to our study, in New York, the most common age range was that comprised between 20 and 24 years of age [8]. Nonetheless, the results of studies undergone in Cuba are more consistent with the results we achieved being that the most common age range was that of 45 to 54 years of age [16]. In this study, it is explained that this is the most frequent age range due to economic independence of the subjects as well as the fact that this is the age range in which most people have an active life. This could be a factor, however, classically, the age range that shows more activity in people, regardless of economic independence is that of 30-35 years of age.

### Gender

The consumption of alcohol is much greater among males. However, this difference does not explain the vast contrast observed in our study in which we found that 95.24% of cases were males. 22.5% of males and 7% of females consume alcohol daily meanwhile 76% and 52.9% respectively have consumed an alcoholic beverage in the last thirty days [7].

This is an indication that there must be other relevant factors involved with alcohol consumption other than gender. Regardless of the fact, what is certain is that statistics show that a higher consumption and abuse of alcohol is found in men versus women.

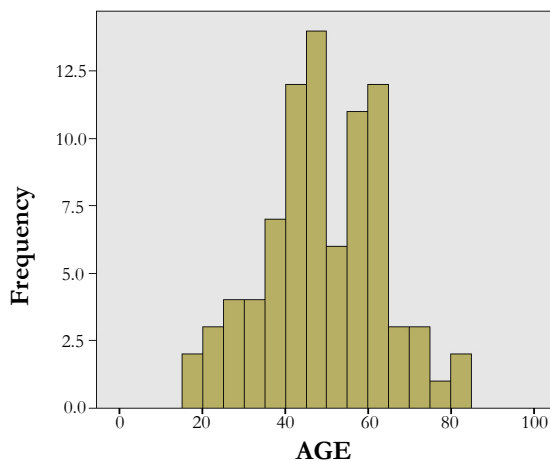
### The Day Most Associated with Death

As time progresses, the Anglo-Saxon pattern of alcohol consumption (high hourly consumption only on particular days) is more popular. Therefore, we found that the most common day for a violent death associated with alcohol to occur is Saturday. More than a third of the cases in our study (39, 29%) show that death occurred on the weekend. This number would be higher if deaths that occurred on Monday morning were also taken into account. Two out of eleven cases that occurred on Monday took place in the early hours of the morning (before 8:00 AM). If this was taken into consideration, it would increase the percentage to 41.67% of cases.

### Time of Death

The times of death are distributed fairly evenly, highlighting two

Figure 1. Results obtained in accordance with the age.



peaks: one between 6:00 PM and 7:00 PM and the second between 10:00 PM and 11:00 PM. Data involving time of death was obtained in seventy-five out of the eighty-four cases in our study. Nine cases were lost due to having the time of death taken into account in days instead of a particular hour of the day. All this indicates that the tendency is for these deaths to take place in the final hours of the day. This is logical being that it is the time of the day in which alcohol is more frequently consumed.

**Judicial Territory**

Interesting information was found being that rates of alcohol related death per 100,000 habitants, that marked a great difference between territories, were achieved. The town of A Fonsagrada stands out with a rate very superior to that of the runner-up, which was found to be the town of Becerreá (82.91 and 35.10 respectively). The rate of alcohol related death per 100,000 habitants in remaining territories is distributed homogenously. The reason why so many cases were found in these particular towns have not been studied, however, we could attribute these findings to socio-demographic and geographical circumstances being that they are the least populated, more rural and isolated areas of the

province of Lugo with a probable higher rate of alcoholism when compared to surrounding territories.

**Medical History**

The results regarding this section are inconclusive being that in the majority of cases we were not able to obtain medical history (70 out of 84 cases). In five out of the fourteen cases in which some medical information was attained we found harmful use of alcohol, which is directly related to the study.

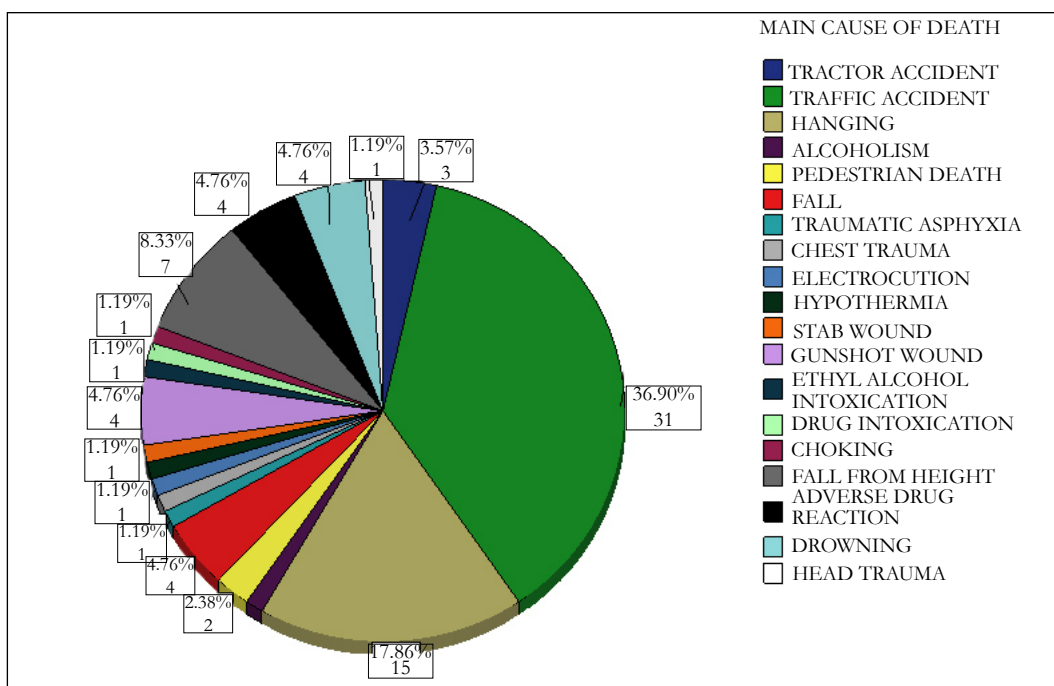
**Main Cause of Death**

The most frequent main cause of death is traffic accidents (36.9% of all violent deaths associated with alcohol). In second place is suicidal death due to hanging (17.86%). The third most prominent cause is falling from heights with a total of 7 cases representing 8.33%. All other main causes of death were less frequent. The only study with which we can compare ours to is that of Matos Abella [16], in which the first positions were occupied by traffic accidents (including getting run over by a car), which represent 19% and 16.8% respectively. Occupying the third position

**Table 1 : Rate of alcohol- positive deaths related to the population in judicial territories.**

Judicial Territory	Rates (alcohol related deaths/100.000 population)
A Fonsagrada	82,91
Becerreá	35,1
Chantada	18,28
Lugo	20,45
Mondoñedo	32,55
Monforte	17,6
Sarria	24,87
Vilalba	24,15
Viveiro	17,01

**Figure 2. Results obtained considering underlying cause of death.**



is death caused by hanging with 11.9% of cases. Therefore, two of the top three causes coincide. However, in our study, the percentage of traffic accidents is much greater while those specifically caused in pedestrians have shown a decrease probably due to an advance in infrastructure as well as a better consciousness in drivers.

**Immediate Cause of Death**

The results in this section vary due to two main reasons. One is the lack of accuracy in determining the exact cause of death, which leads to selecting a more general or standard cause versus a more accurate one. The second reason is that there is no criteria established that allows all medical examiners, in a particular circumstance, to choose the same immediate cause. This lack of standardization also accounts for disparities in the results. If we analyse the table we can observe that asphyxia and traumatic shock stand out, however not significantly. In other studies [16], traumatic and hypovolemic shock are more common. Traumatic shock is secondary to traffic accidents while hypovolemic shock is related to both traffic accidents as well as gunshot wounds.

**Manner of Death**

More than three quarters of the cases were due to accidental deaths (72.62%). This put us in the position to consider loss of responsiveness as well as the unlikeliness of subjects to be able to prevent a dangerous situation. Where suicides are concerned (26.19%), alcohol is known to be a way to recuse oneself and have the impulse to commit suicide.

In other articles we found mixed results [1, 8, 10, 15, 16, 17, 21, 23]. Nevertheless, most of them only analyse the percentage of cases that tested positive for alcohol within each manner of death. In a study that took place in Cuba [16] 58.4% of deaths were accidental, 24.3% suicidal and 17.3% were homicidal. What sparks our attention are the number of homicidal cases found in Cuba while in our study the most frequent ones were those that were accidental.

**Blood Alcohol Concentration**

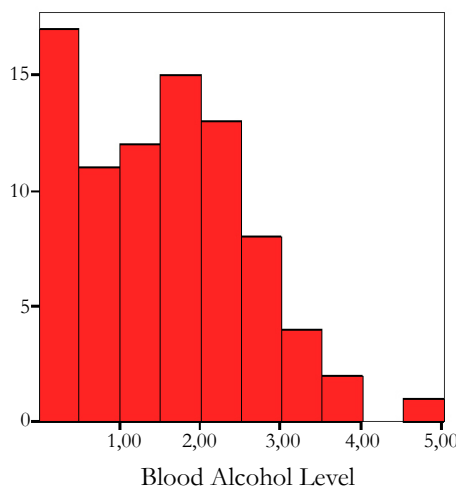
In most cases we found a blood alcohol concentration less than 2.50 g/L, the average of all the cases being 1.59 g/L and the standard deviation being 1.06 (Table 2 and Figure 3).

**Other Toxic Substances**

We can confirm that in the majority of cases we included in our study, the only toxic substance consumed was alcohol. We only found the presence of other substances in 11.90%.

Recently, it is perceived that the influence of alcohol on the population is less important than what it used to be. This may be due to the decrease in its use, the change in the pattern of consumption as well as the decrease in the number of traffic accidents. However, this way of viewing things is very far from reality. Despite the increased sense of danger of the drug, 31.2% of deaths due to traffic accidents in 2008 occurred in individuals under the influence of alcohol. In this study, we observed that the proportion of violent deaths in relation to alcohol is increasing even though it is small (16.96% - 19.13%).The pattern of the manner of death

**Figure 3. Results obtained on the basis of alcohol.**



**Table 2. Statistical values for blood alcohol concentration.**

N	
VALID	83
LOST	1
AVERAGE	1,5961
MEDIAN	1,5500
STD. TYP.	1,06737
MINIMUM	,00
MAXIMUM	5,03

is irregular. What we found was that the percentage of accidental death increases at first to later decrease while the exact opposite occurs in the case of suicide.

Compared to other parts of the world that have published their statistics, the results found in Lugo would be found between those obtained in Finland [15] and slightly over those found in Poland [17], finding alcohol in 17.75% of the registered cases of violent death in this territory. More so, Lugo has the lowest proportion in suicide cases (14.96%) despite being the province of Spain with the highest suicide rate per 100.000 habitants (15.14 in 2009).

### Conclusion

1. In this study, we observed that the proportion of violent deaths in relation to alcohol is increasing even though it is small (16.96% - 19.13%).
2. The most common victim profile was that of a middle-aged male (between 40-50 years of age).
3. Such deaths occur more frequently on weekends being Saturday the day with the highest risk. This coincides with the increasingly widespread pattern of Anglo-Saxon consumption in Europe. Where time of death is concerned, the intervals between 6:00 and 7:00 PM and between 10:00 and 11:00 PM are the most common.
4. The most frequent cause of death is traffic accidents. In second place, suicidal death due to hanging and in third place falling from heights.
5. The judicial territory with the highest rate of alcohol related deaths was found to be the town of A Fonsagrada exceeding the second, Becerreá, by more than double. The lowest rate was found in the judicial district of Viveiro.
6. The average level of alcohol in blood that was found was 1.59 g/L. Almost all cases were below 2.50 g/L. Also, it was found to be the only consumed toxic substance.

### References

- [1]. Andreuccetti G, de Carvalho HB, de Carvalho Ponce J, de Carvalho DG, Kahn T, et al. (2009) Alcohol consumption in homicide victims in the city of Sao Paulo. *Addiction*. Dec 104 (12): 1998-2006.
- [2]. Blomgren J, Martikainen P, Mäkelä P, Valkonen T (2004) The Effects of Regional Characteristics on Alcohol-Related Mortality—a Register-Based Multilevel Analysis of 1.1 Million Men. *Social Science and Medicine* 58: 2523-35.
- [3]. Bradvik L, Berglund M, Frank A, Lindgren A, Löwenhielm P (2009) Number of addictive substances used related to increased risk of unnatural death: A combined medico-legal and case-report study. *BMC Psychiatry* 9: 48.
- [4]. Brian, H (1990) Alcohol y delito. En B. P. Bluglass R, Principles and practice of forensic psychiatry. London.
- [5]. Carrasco J.J, M. J (2005) Manual de Psiquiatría Legal y Forense (3rd edtn) Madrid: La Ley.
- [6]. de Pourtales MA, Hazen C, Cottencin O, Consoli SM (2010) Adolescence, substance abuse and suicide attempt by jumping from a window 39(2): 177-86. Epub 2009 Nov 26.
- [7]. Drogas P. N (2007) Observatorio Español sobre Drogas. Ministerio de Sanidad y Consumo.
- [8]. Ernest L. Abel, Zeidenberg P (1985) Age, Alcohol and Violent Death: A Postmortem Study. *Journal of Studies on Alcohol* 46(3): 228-231.
- [9]. Galea S. R (2005) Drug Use, Misuse, and the Urban. *Drug and Alcohol Review*, 24(2): 127-36.
- [10]. Haukka J, Suominen K, Partonen T, Lönnqvist J (2008) Determinants and Outcomes of Serious Attempted Suicide: A Nationwide Study in Finland, 1996-2003. *Am J Epidemiol* 167: 1155-1163.
- [11]. Institute of Legal Medicine Galicia (Imelga). (2009). Annual Report 2009 of the Institute of Legal Medicine. Santiago de Compostela: Xunta de Galicia.
- [12]. Instituto Nacional de Estadística. Defunciones según la causa de muerte. Población de Lugo por ayuntamientos.
- [13]. Kaplan MS, McFarland BH, Huguet N (2009) Characteristics of adult male and female firearm suicide decedents: findings from the National Violent Death Reporting System. *InjPrev* 15(5): 322-7.
- [14]. Lorenzo P, L J (2009) Drogodependencias. Farmacología. Patología. Psicología. Legislación (3rd edtn) Madrid: Médica Panamericana.
- [15]. Lunetta P, Penttilä A, Sarna S (2001) The role of alcohol in accident and violent deaths in Finland. *Alcohol ClinExp Res* 25(11): 1654-61.
- [16]. Matos Abella, R. B. (2001). Muertes violentas y consumo de alcohol. *Adicciones* 13(1): 75-80.
- [17]. Minias R, Berent J (2006) A comparative analysis of types, causes and circumstances of deaths based on autopsy reports from the periods of 1945-50 and 1990-1993. *ArchMedSadowejKryminol* 56(2):71-9.
- [18]. Peter Anderson, B. B (2006) Alcohol in Europe; A public health perspective. United Kingdom: Institute of Alcohol Studies.
- [19]. Rivara FP, Mueller BA, Simes G, Mendoza CT, Rushforth NB, et al.(1997) Alcohol and illicit drug abuse and the risk of violent death in the home. *JAMA*. 278(7): 569-75.
- [20]. Saukko P, K. B (2004) Knight's Forensic Pathology (3rd edtn) Hodder Arnold.
- [21]. Skibin L, Bilban M, Balazic J (2005) Harmful alcohol use of those who died a violent death (the extended region of Ljubljana 1995-1999). *ForensicSci-Int* 147: 49-52.
- [22]. Spitz, F (2004) Medicolegal Investigation of Death. Guidelines for the Application of Pathology to Crime Investigation (4th edtn) Thomas.
- [23]. Razvodovsky YE (2009) Alcohol and suicide in Belarus. *PsychiatrDanub* 21(3): 290-6.