Alcohol involvement in fatal road accidents in Spain

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INTRODUCTION

Studies carried out since the 1930s have indicated a strong relationship between increases in blood alcohol concentration in a motor-vehicle driver and increases in the risk of his/her involvement in a road crash and related morbidity and mortality. Two out of every three European citizens who are old enough to drive do so and about 47% of European drivers drink alcohol at least once per week. When drivers were interviewed, 10% said that they might drive while over the legal limit in their country, and it is estimated that 3-4% of journeys by car involve drivers with a blood alcohol of 0.5 gr/l or more. About 5% or less of drivers cause 20% of traffic accidents where there are serious or fatal injuries while under the influence of alcohol (Alvarez & Del Rio, 1996; Biecheler & Cauzard, 1995; European Transport Safety Council, 1995). Although drink-driving has been on the decline in many European countries, the problem remains serious.

The problem of drink-driving is of special relevance in Spain. This is not only due to the fact that it is normal to consume alcohol and, consequently to drive under the influence of alcohol, but also to Spain's alcohol-related culture: its society is very permissive towards consumption and is tolerant towards alcohol-related problems (Alvarez et al., 1995). A driver population based survey revealed frequent alcohol consumption: 62.9% of those surveyed were regular drinkers, with a mean daily alcohol intake of about 47 grams of pure alcohol. The study also showed that those who drove regularly were more likely to drink and had a higher alcohol intake. Furthermore, about 14% even acknowledged that on some occasions in the previous year they drove 'in a drunken state' (Alvarez et al., 1995).

As is the case in other European countries, Spanish legislation establishes legal blood alcohol concentration limits of 80 mg/dl [0.8 gr/l] in motor-vehicle drivers; 50 mg/dl [0.5 gr/l] in those driving vehicles over 3,500 kg; 30 mg/dl [0.3 gr/l] in those driving vehicles used for transporting passengers and dangerous merchandise. Driving vehicles over these limits is penalised. Traditionally, determining alcohol by breathalyse has taken place in three situations: drivers involved in accidents, drivers fined for offences against the law of traffic safety, and
random breathalyser tests. 1,124,851 alcohol breath tests were carried out on about 16.3 million drivers in 1994. Positive readings were found in 6.1% of drivers involved in accidents, 4.7% in those drivers fined for offences, and in 2.3% of those random breath tests carried out. Information relating to the role of alcohol in road accidents among Spanish drivers is scarce, particularly those involved in fatal road accidents.

The present study has been designed with the aim to assess the presence of alcohol in blood samples of Spanish drivers involved in fatal road accidents. The study has been supported by the Dirección General de Trafico (National Traffic Agency).

**METHODS**

**Study 1:**
This study was carried out at the University of Valladolid and supported by the National Traffic Agency (Madrid). 322 blood samples from people killed in road traffic accidents were obtained between January 1994 and October 1996. In 37 cases analytical procedures could not be carried out, and as results the final sample was of 285 cases. Numbers were 255 male and 30 females. 33.7% (n= 96) were cases of people between 16 and 25 years of age, 45.3% (n= 129) were between 26 and 45, and 21.0% (n= 60) were over 45. 39.6% (n= 113) were cases of people killed on week days (Monday to Friday) and 60.3% (n= 172) at weekends (Saturday and Sunday). The average age (± SD) was 34.1 ± 13.2, 33.9 ± 13.1 for men and 36.0 ± 14.7 for women. In the said study information regarding sex, age, day of the week and time of the fatal accidents was obtained. Analytical procedures were not carried out with any legal objective but with research purposes.

**Study 2:**
Blood samples of 979 people killed in road traffic accidents were obtained between 1992 and 1995. The cases were referred to the Instituto Nacional de Toxicología (National Toxicological Centre, Madrid) by the forensic doctors or as instructed by the judge. 887 were male while 86 were female (the sex was not known in 6 cases). With reference to the days of the week, figures were as follows: Monday 123, Tuesday 101, Wednesday 104, Thursday 102, Friday 139, Saturday 207 and Sunday 200 (the day of the week was unknown in 3 cases). The average age of the people involved in fatal accidents was 35. In these cases information exists as regards the characteristics of the person involved and the accidents thanks to the report written by traffic agents. Furthermore, information about the forensic doctors' investigation are available. Analytical procedures were carried out with legal objectives.
Analytical procedures:
Blood samples were analyzed for alcohol (ethanol) by Head Space Gaschromatography. All samples were also screened for the presence of drugs other than alcohol (medicines and illegal drugs) by immunological or chromatographic methods when appropriate. Positive results after screening were confirmed by alternative methods (GC/MS, HPLC or GC methods) and the concentrations of the psychoactive drugs or metabolites were determined (Peat & Finkle, 1992; Tedeschi et al., 1992).

Statistical analysis:
Analysis of the data was conducted in the Data Processing Centre at Valladolid University. Statistical analysis was by means of SAS software version 6.07 (SAS Institute SAS). p-Values ≤ 0.05 were considered to show significant differences.

RESULTS

Table 1 shows the results obtained in both studies as regards the presence of alcohol in the blood of people killed in road traffic accidents; alcohol was detected in more than half of the people killed. No substance (alcohol, medicines or illegal drugs) was detected in 40-42%.

When concentrating on the case of alcohol, it can be observed that in most of the cases only alcohol was detected. In 18 out of 144 cases in the first study (12.5%) and in 68 out of 502 cases in the second study (13.5%) another substance or other substances together with alcohol was found. Table 1 shows the percentages of the total sample (n= 285 and n= 979).

Blood alcohol level was classified on two scales: 0.01 to 0.79 gr/l and 3 0.8 gr/l (80 mg/dl). It has been observed in both studies that in most of the cases the blood alcohol level is 30.8 gr/l, the legal limit in Spain for car drivers. In study 1, 101 out of 126 cases (80.2%), and 366 out of 434 cases (72.9%) in study 2 showed these levels. Table 1 shows the percentages of the total sample.
Table 1: Presence of alcohol in people killed in road traffic accidents in Spain.

<table>
<thead>
<tr>
<th>Substances Found Together</th>
<th>Study 1 [n = 285]</th>
<th>Study 2 [n = 979]</th>
</tr>
</thead>
<tbody>
<tr>
<td>No substances detected</td>
<td>40.0 [114]</td>
<td>41.6 [410]</td>
</tr>
<tr>
<td>Alcohol detection</td>
<td>50.5 [144]</td>
<td>51.3 [502]</td>
</tr>
<tr>
<td>On its own</td>
<td>44.2 [126]</td>
<td>44.3 [434]</td>
</tr>
<tr>
<td>With other substances</td>
<td>6.3 [18]</td>
<td>6.9 [68]</td>
</tr>
<tr>
<td>0.01-0.079 gr/l</td>
<td>15.1 [43]</td>
<td>13.9 [136]</td>
</tr>
<tr>
<td>3 0.8 gr/l</td>
<td>35.4 [101]</td>
<td>37.4 [366]</td>
</tr>
<tr>
<td>Alcohol on its own</td>
<td>44.2 [126]</td>
<td>44.3 [434]</td>
</tr>
<tr>
<td>Alcohol + medication</td>
<td>1.4 [4]</td>
<td>2.35 [23]</td>
</tr>
<tr>
<td>Alcohol + illegal drugs</td>
<td>4.2 [12]</td>
<td>4.1 [41]</td>
</tr>
<tr>
<td>Alcohol + medication + illegal drugs</td>
<td>0.7 [2]</td>
<td>0.4 [4]</td>
</tr>
</tbody>
</table>

Finally, Table 1 shows the results of the type of substance found together with alcohol. Three categories have been formed. Alcohol together with medication was encountered in 22.2% [4 out of 18] of the cases in study 1, and in 33.8% [23 out of 68] of the cases in study 2. Alcohol with illegal drugs, which is the most frequent combination, was observed in 66.6% of the cases in study 1 and 60.3% in study 2. The presence of alcohol with medicines and illegal drugs was not common (11.1% and 5.9%, respectively). As in previous cases, Table 1 shows these percentages of the total sample.

The presence of alcohol is more frequent among men than among women, and similarly at weekends rather than on week days. Concerning age, the presence of alcohol is frequent among younger people (16-25 years old), although levels 3 1 gr/l were more frequently detected in the 26-45 age range. The temporary evolution between 1992 and 1996 shows that for all years alcohol was found in more than 50% of the people killed in road traffic accidents. The percentage of cases in which blood alcohol level was 3 0.8 gr/l varies between 35% and 41%.
DISCUSSION

The data presented show clearly that alcohol is frequently found in people killed in road traffic accidents in Spain. Using the same analytical methodology but with different objectives (research or legal purposes), the data from both studies show practically similar results: i) The presence of alcohol was detected in more than half of the cases. ii) Only alcohol was found in most of the cases (86-87%), iii) and in two of three of these cases the blood alcohol level was 3.0 gr/l. iv) When alcohol was detected together with other substances, the substances found in two out of every three cases was an illegal drug. Other data to be mentioned are that these tendencies were observed during the years under scrutiny (1992-1996) and that positive alcohol cases are more common among men, young people and at weekends. In the ICADS Conference held in Cologne in 1992, Bermejo et colleagues (1993) presented a study carried out on 113 people involved in road accidents. In that study, blood alcohol concentrations over 50 mg/dl were found in 70.8% of the cases.

The present data show that as in most developed countries alcohol detection in people killed in road traffic accidents is common (Ferrara et al., 1994). It is widely recognized that alcohol consumption is a causal factor in 30-50% of fatal road accidents (Council on Scientific Affairs, 1986). It is of priority to intervene in the field of alcohol and driving. Drink-driving does have to be tackled in an integrated and multidisciplinary way: blood alcohol limits, publicity campaigns, enforcement procedures, and penalties, among other countermeasures (Alvarez & Del Rio, 1996).

REFERENCES


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